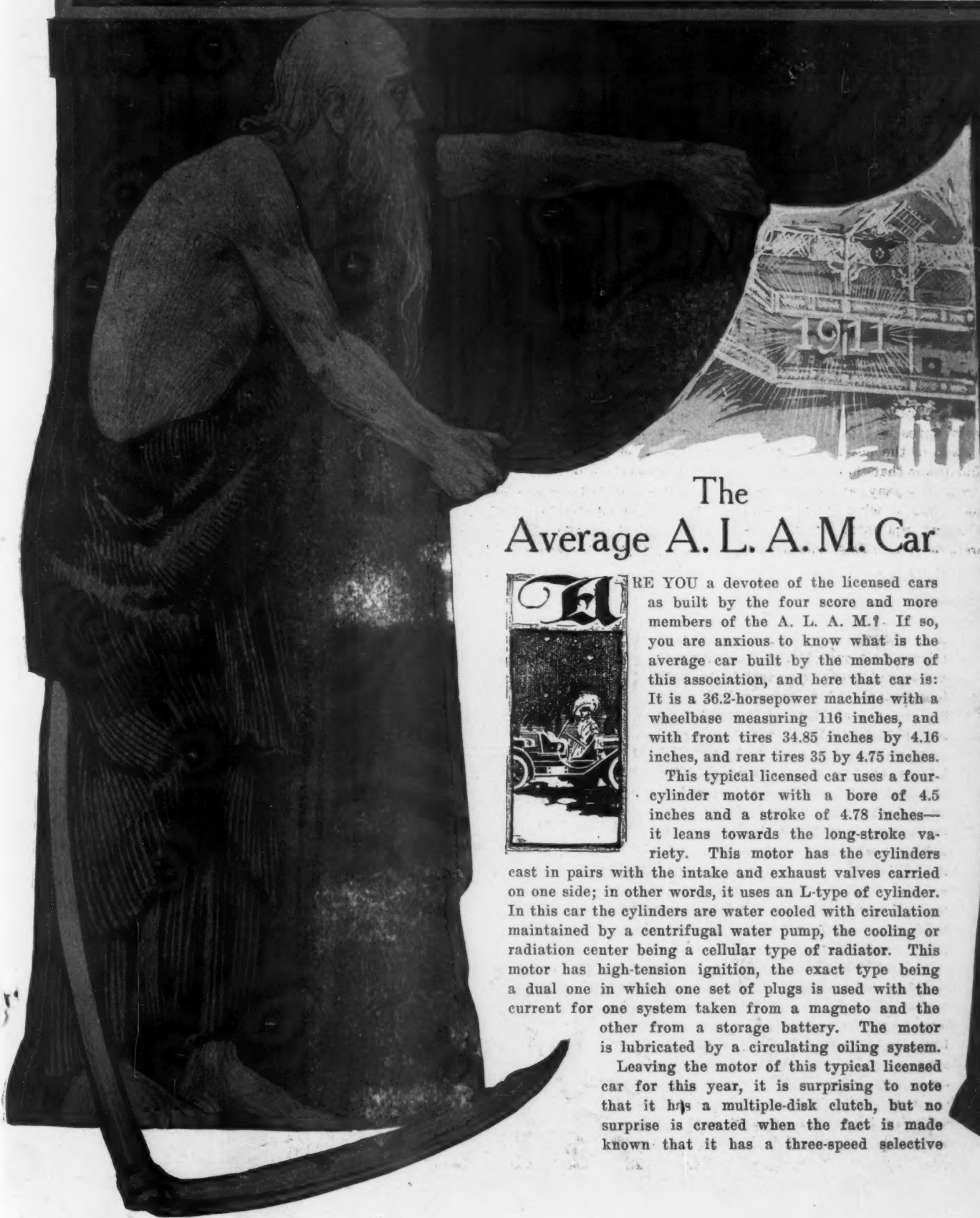


MOTOR AGE

TRANSPORTATION LIBRARY



The Average A. L. A. M. Car



ARE YOU a devotee of the licensed cars as built by the four score and more members of the A. L. A. M.? If so, you are anxious to know what is the average car built by the members of this association, and here that car is: It is a 36.2-horsepower machine with a wheelbase measuring 116 inches, and with front tires 34.85 inches by 4.16 inches, and rear tires 35 by 4.75 inches.

This typical licensed car uses a four-cylinder motor with a bore of 4.5 inches and a stroke of 4.78 inches—it leans towards the long-stroke variety. This motor has the cylinders cast in pairs with the intake and exhaust valves carried on one side; in other words, it uses an L-type of cylinder. In this car the cylinders are water cooled with circulation maintained by a centrifugal water pump, the cooling or radiation center being a cellular type of radiator. This motor has high-tension ignition, the exact type being a dual one in which one set of plugs is used with the current for one system taken from a magneto and the other from a storage battery. The motor is lubricated by a circulating oiling system.

Leaving the motor of this typical licensed car for this year, it is surprising to note that it has a multiple-disk clutch, but no surprise is created when the fact is made known that it has a three-speed selective

gearset and shaft drive. On this car the gearbox is located in the middle of the chassis.

These facts relative to the average licensed car are taken from an average of the 188 different chassis built by the eighty-nine members of the association. The facts relative to the various chassis details were obtained direct from the manufacturer, so that the facts are as authentic as it is possible to have them.

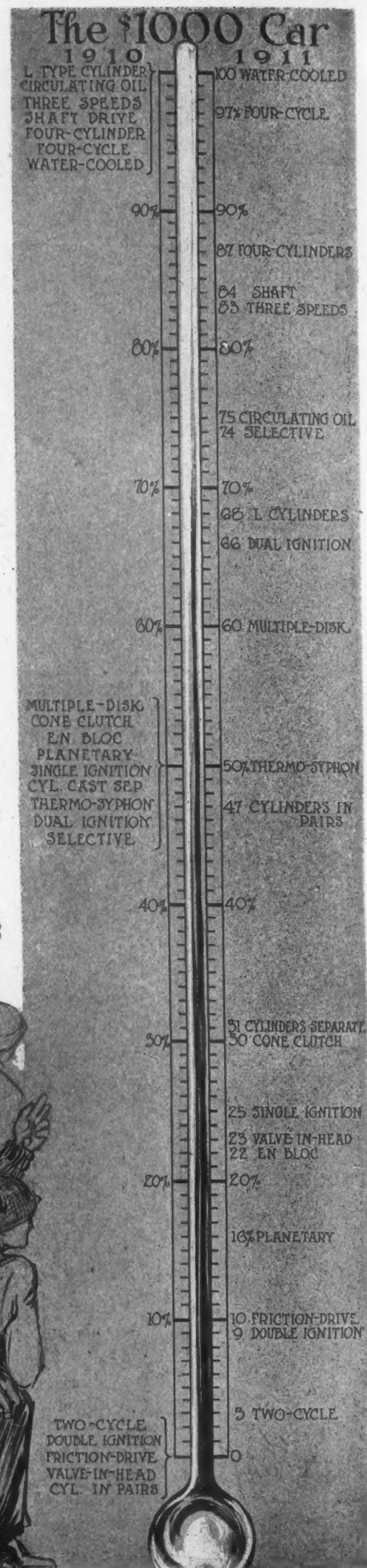
When these different specifications of this average car are analyzed the reader cannot but conclude that they very truthfully represent the product of the various association makers. Some will wonder at the fact that the L-cylinder design has beaten the T-head out, but this is due to the large number of makers of low and medium-powered machines, who build an L-type because it is a cheaper manufacturing proposition and one which gives most satisfactory results. Some may be amazed to think that the cellular radiator has beaten the tubular one out, but nevertheless it is a fact. A year ago the tubular was the leader, but not so now. The tubular is the leader on the \$1,000 and \$1,500 cars, but not on the \$2,500 and \$4,000 machines. The multiple-disk clutch has not much to brag about, as it is nearly tied with the cone type.

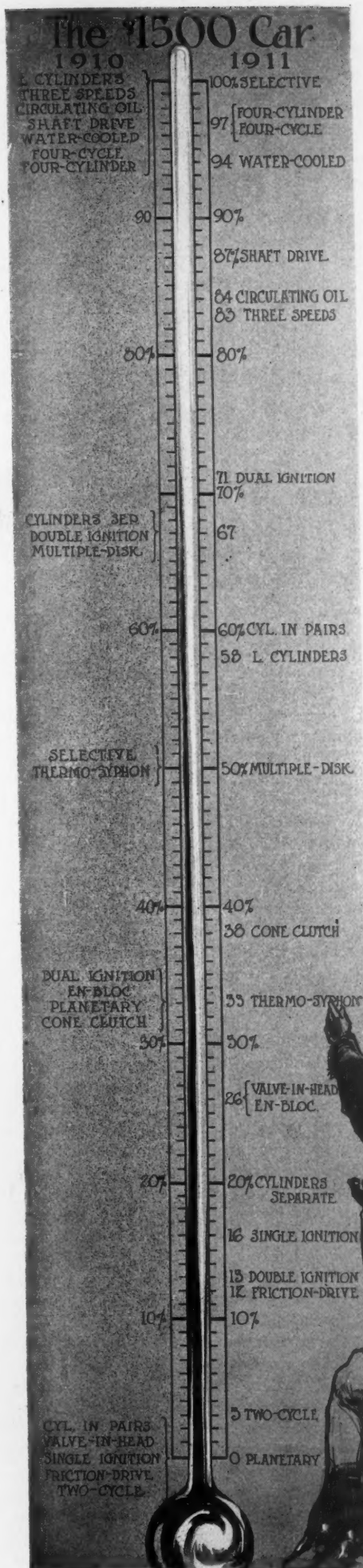
The fact that eighty-nine manufacturers build but 188 different chassis types with different motor sizes is a good indication of the reduction in the number of chassis models. This means that there are but two models for each company, which is a very conservative situation when it is remembered that a year ago some concerns had seven different models. This reduction of

the number of models means a reduction in the manufacturing cost for the year. Where there are few models there is a reduction in the factory cost due to fewer adjustments of the different machines, which, when once set to turn out a certain part for one model can continue turning out that part until the end of the year.

Every year has its sensation row, if the use of this accentuated term may be permitted, and this year it is the torpedo and fore-door body, with the fore-door used on limousines as well as touring cars. The torpedo has made many friends, but there are a great many who believe that it will not be so prominent a year hence as it is today, and that like the three-passenger roadster with the rumble seat it will eventually become extinct. The comparison is scarcely correct, because the torpedo has many commendable features, whereas the rumble seat was, in many cases, only a decoration that in emergencies was used to carry a passenger. With the fore-door touring car the situation is slightly different, in that it is meeting with instant approval. It is most comfortable in winter and may be a little hot in summer, but that trouble can be easily rectified. One concern has already fitted an inconspicuous ventilator which is most efficient and which can be left off in winter time.

The question of lamps has not been given so much attention as was expected, but there is a growing tendency to use smaller sizes. Only one concern has followed that admirable practice of locating the dash lamps in the hooded dash, so that all that is seen outside of the car body is the circular front glass in the cor-





ner of the dash and a slight hood over it. This enclosing of the dash lamp adds materially to the car's appearance and before another year has come around there will be many more who have followed this example.

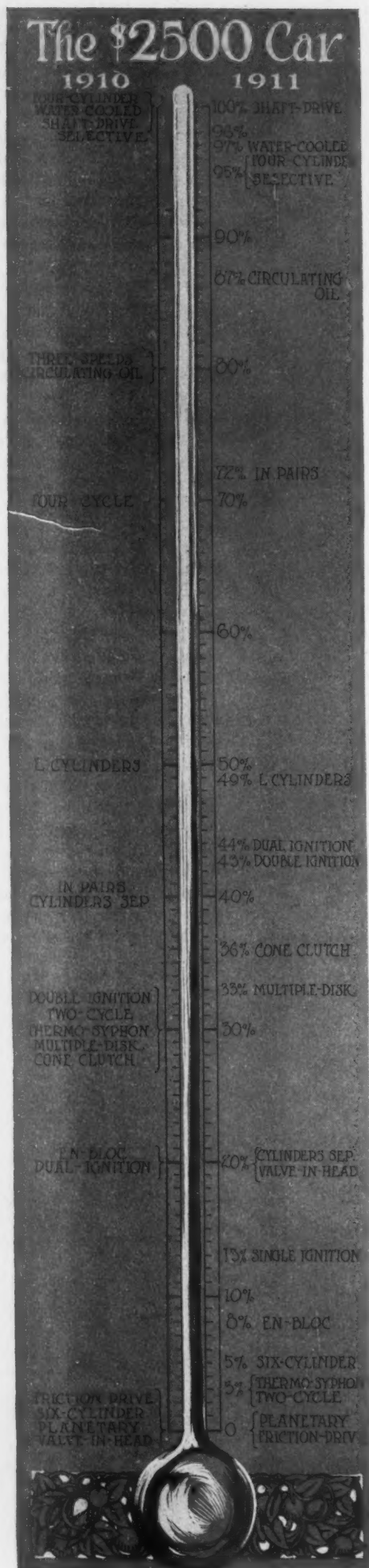
To say that the 1911 car is in any sense a revolution, as compared with the car of a year ago, would be to give a false impression of the real situation. There have been few radical changes in spite of the general talk about sleeve valves and other constructions. The efforts of the engineering departments have been directed more to a cleaning up of the old jobs, with adding here a dash of better design and bringing some other part up to the standard of the higher-priced machines. It is the little things that make up the sum total of the good car, and although these have been neglected by many makers in the past, they are now coming in for the lion's share of attention. In the days when every effort was centered on getting some power out of the motor the carrying of the ignition cables was overlooked, but now many have all the power they want and the engineering departments have busied themselves in making the motor a better looking and more accessible proposition. The ignition cables are all better enclosed; the shutter valve is more general on the carburetor; the hot-air intake pipe on the carburetor has gained; there is a larger filler cap to pour oil into the crankcase; an automatic adjustment of the fan belt has been fitted; the radiator has been enlarged an inch or so, and perhaps a change made from the tubular to cellular or vice versa; the magneto jaw coupling to correct the spark timing has been simplified; the water pump has been given rigidity with an extra bearing; a dual ignition system has taken the place of a double or single set; a circulating

oiling system has superseded the mechanical oiler; and so on and so on. It is the accessory that has been looked after. The manufacture of the cylinder has been satisfactory; the bearings have been large enough; the piston has been balanced; the connecting rod has been of the desired length; the case hardening has been satisfactory, and, in a word, all the main essentials have been up to the mark except in a few medium-priced machines, so that it has not been the essentials but the secondaries that have received attention.

There have not been many new models brought out during the year, and there are few concerns that have reconstructed their old models. The Locomobile company has entered the field of the six-cylinder class. So has the Pope-Hartford. But with these two exceptions there has not been anything of real importance in the situation. The Hudson has an entirely redesigned motor and gearset, and in fact this chassis is the one that has had as big an alteration program as any.

One feature stands out prominently, and that is the slide back that the low-tension ignition system has received. A year ago there were several concerns that pinned their entire faith to this type, but now there are only a couple that use it without giving an option on the high-tension system. The Locomobile has changed to the high-tension system; the Premier fits the high-tension but gives an option on the low-tension also; the Columbia, on its new model, fits high-tension and adds this to the low-tension system on its carried over models; the Matheson, on its four-cylinder car, has added an option of high-tension to the standard low-tension type. The two concerns to still fit nothing but the low-tension are the Garford and the Rainier. On the Garford the magnetic spark plug is used.





Barometer of the Motor Car

By Charles E. Duryea
A. L. A. M. Technical Expert

MANY people, remembering the history of the bicycle, look forward to the day when motor cars can be bought for a fraction of their present prices, and in the meantime are losing much pleasure and profit which could be derived from their use. The question, "Will prices be appreciably lower?" is therefore of much interest and at no time is there better opportunity to answer this than at the great double shows in the Madison Square garden.

At the first real show, held in the garden 10 years ago, there were many vehicles at prices around \$600, and it is certain that the average price was much below \$1,000. In those days nobody believed that anybody would pay modern prices, no matter how capable and well finished the vehicle might be. But people bought and asked for better, and prices began to rise. In 1903 the average price was \$1,113. In 1904 it had risen to \$1,351, and by the next year to \$1,609, and still further rise took place before the panic of 1907 checked the purchasing power of the people temporarily. Since the panic there has been some fall in the average price, partly due to better production facilities and principally due to the advent of smaller and lower quality cars. That this latter is the main factor is shown by a comparison of the present Madison Square garden show statistics with those of last year.

This show includes nearly all of the older and better known makers whose products are by-words in motoring circles the world over and represents the actual trend of prices much more accurately than prices fixed by new concerns whose products are too often marketed before their costs are known, with loss and failure to their makers. Last year at this show the products of some of the makers of small machines of large output were not exhibited and this fact would tend to lessen the average price this year. Yet in spite of these facts a comparison of the prices of the 2 years shows a reduction of less than 2 per cent. Clearly the downward rush of prices some folks have been looking for is not sweeping along so fast as to take anybody off their feet.

But there is another side to this matter. Each and every maker without exception is raising the standard of his goods. In some instances the better quality is coupled with an increased price, but in general the better goods are given to the public at the same price, and the public is looking for the quality. Few expenditures of money yield the pleasure or the profit that the motor car does, and on this account the buyer looks for the best rather than the cheapest.

Further, it is well known that the cost of living, and therefore of labor and materials, has gone up. It is manifestly impossible to lessen costs under such conditions if quality is to be maintained. But better designing, the products of the ever-busy inventor, improvement in the factory methods and many other things have made it possible to turn out better goods.

There are many reasons for an increase in prices. Only a few years ago a magneto was a curiosity, for which the maker almost had to apologize for putting on; to-day hardly a car goes out unless equipped with magneto or single spark device. And these magnetos are not stuck on in any haphazard manner, but are fitted as part of the engine, with their driving gears encased and run in oil. Oiling systems are no longer scattered all over the dash, with a multitude of pipes to the various bearings, but are incorporated in the engine case, where they can work under the most favorable conditions.

Steel frames of superior material and latest designs, usually swept in at the front to allow of short turning and raised at the rear to get over the axles, now take the place of the straight frames of but a few years ago. Wheelbases, once short as horse carriages and later carrying the rear passengers well back of the rear axle, have been lengthened till today there is a very decided difference in the comfort of the passengers. Large wheels have likewise added their quota. The small tire of former years has had to give way. The large diameter wheel with a good, strong, large tire has taken its place. This costs the maker more and the user less, and is simply one illustration of the way in which the relation of values to costs have greatly changed to the advantage of the buyer. While motor powers have not appreciably increased, smaller motors are doing better work.

Carbureters, transmissions, bearings and mufflers, and in fact every part of the car, has been bettered. Upholsterings are now made to use with deep springs, and ample room in the generous bodies. Even the car springs are much longer than formerly. The car has largely ceased to be a machine and has become a carriage in its comfort and luxuriousness. Like the modern carriage, nowadays practically all cars have tops and run in all weathers; whereas a few years ago the top was the exception. Solid enclosed bodies of the limousine type are seen on every hand. While four-cylinder cars show little, if any, diminution, six-cylinder cars show an increase of nearly 50 per cent. Torpedo and fore-door bodies are now common and represent increased luxury at an increase in price usually.

Equipments are now more often included in the price and while often the price is raised to cover these, the result is a saving to the purchaser.

Strides of the Motor Industry

MAKING strides of a gigantic nature, the motor car, since the first show in Madison Square garden, New York, 11 years ago, has traveled from a place where it was the toy of the rich and a vehicle for pleasure only to its present position in our industrial life, where it can truthfully be called a tool of civilization. Instead of motoring being considered a fad, it now is a necessity, like any other means of transportation, and its position as a time-saver answers fully any question as to its future.

It has performed in most loyal fashion ever since it came into general use, and certainly no other invention of which we have record has traveled the pace which marks the advance of the motor car during the past 10 or 11 years. To appreciate the progress which has brought the gasoline-fed vehicle to its present high position one has but to consider the short time since motor cars were considered experiments and curiosities, for such was their status when the first show was held in Madison Square garden 11 years ago.

Each year has seen progress of an extraordinary sort, until we have the perfect car of today, the very latest models of which are shown in the big show. With almost 400,000 machines in use in this country, and the number fast increasing, the statement that the motor car is now the tool of civilization admits of little argument. The so-called pleasure car, or passenger-carrying vehicle, is to a large degree an absolute necessity to a great number of our American people, not one of whom would think of giving up his car any more than he would consider dispensing with his telephone after its advantages were appreciated. In addition there are thousands of new owners entering the field every month.

Cars are now so generally used, and the conveniences and time-saving qualities so strongly in evidence in our everyday life, that machines are not alone taking the place of the horse but are opening up new fields in our lives that would be undreamed of under ordinary conditions. As a health-giver, and as an educational factor, the motor is far more important than as a mere vehicle for pleasure driving. Every family can find almost continuous use for the modern motor vehicle. The head of the house can use it going to and from his business; for making business calls; entertaining customers and business associates, and for touring. This use of the car gives him a greater knowledge of the country, while the mental and physical exercise of driving makes for better digestion and better health. The ownership of a car certainly adds prestige. A man's wife and daughters may use the car for social calls, entertaining and for open-air driving.

On behalf of the sons, it must be admitted that caring for and understanding

**By Alfred Reeves
General Manager A. L. A. M.**

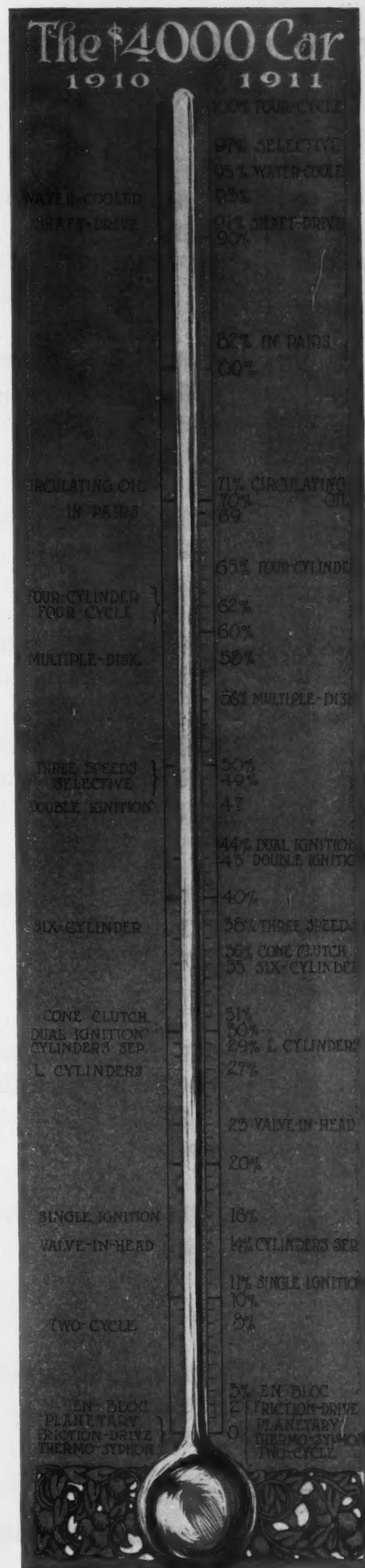
a great piece of machinery like the motor car has an educational value, while the mental and physical faculties in man are developed by driving. The fresh air recreation cannot but improve his health and using the car gives the sons more time with the other members of the family, and therefore brings him under the best influence.

As a willing slave for all work, the motor vehicle is now entering that broad commercial field involving the transportation of freight, and the quicker and more economical distribution of merchandise, which foretells the emancipation of the horse, and will tend to bring close to hand the time when that noble animal will become the pet of mankind instead of the slave of a cruel business life. It would be absurd to say that the horse will be relegated quickly, for with 31,000,000 horses in the country, and some 7,000,000 horse-drawn vehicles, the displacement proposition will be of a steady but not abnormal growth. Nevertheless, the ultimate outcome must see traffic, especially in our large cities, where it is of a congested nature, given over entirely to power-driven machines. It is not too optimistic to say that 10 years from now a horse on the streets of New York will be as rare as a motor vehicle was 10 years ago.

Trade conditions now are like those of any other industry. In the best known ninety factories or so which now produce almost all the cars sold there are ample facilities for making sufficient machines to care for the normal demand.

At the exhibition at Madison Square garden there will be offered a variety of cars and equipment undreamed of a few years ago. It will show everything that an exacting public needs, and while big productions have trimmed down the costs a little, it is offset in many cases by the higher prices of material and increased wages. There will be no general lowering of prices, although with added equipment more style and better material the motor cars at the 1911 prices offer a great deal more for the money than ever before.

With an industry producing a quarter of a billion dollars worth of cars a year, employing about 238,000 men, involving ninety different trades, and having a product sold by some 8,500 dealers owning or renting the finest kind of salesrooms and garages, the whole organization supplying the wants of the American people, which desires to move fast and in comfort and to distribute its merchandise quickly, the motor car may be truly said to have taken its place as a tool of civilization, supplying a need so completely that it is now a part of our great American life.



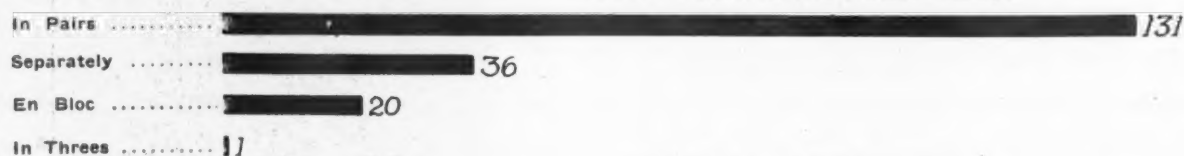
Some A. L. A. M. Car Tendencies of the New Year



NUMBER OF CYLINDERS IN MOTORS



HOW CYLINDERS ARE CAST



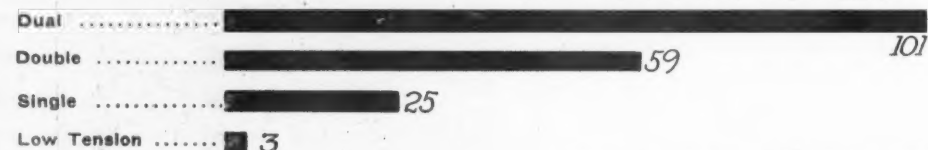
COOLING OF THE MOTOR



TWO RADIATOR TYPES



THE IGNITION SYSTEMS



THE LUBRICATING SYSTEMS



FOUR CLUTCH DESIGNS



FOUR GEARSET CLASSES



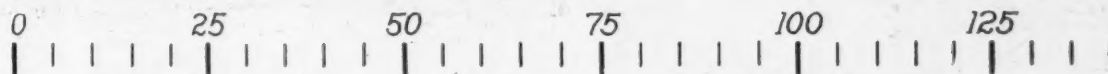
GEARSET LOCATION IN CHASSIS



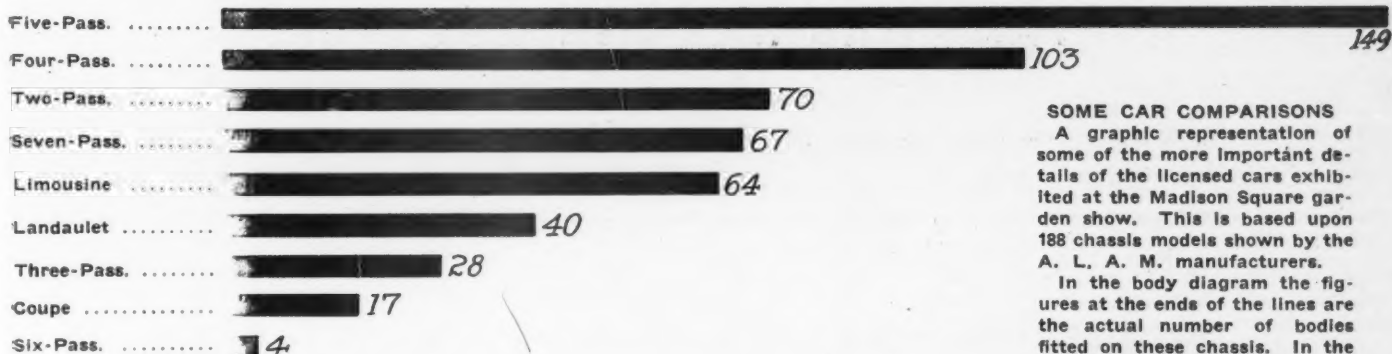
SHAFT OR CHAIN DRIVE



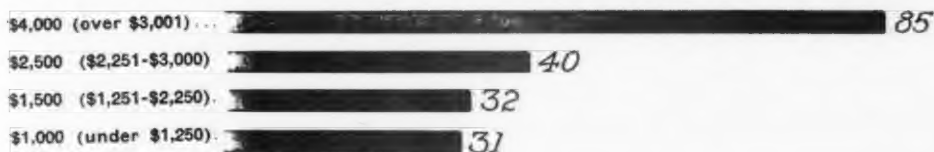
Chart Showing Body, Wheel And Tire Status



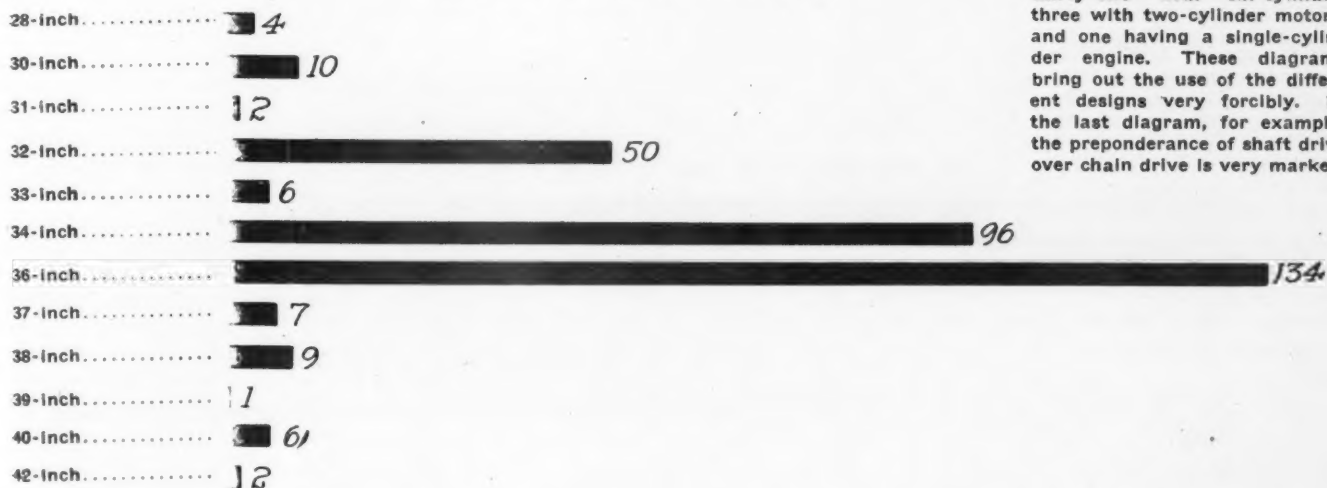
NUMBER OF CARS WITH DIFFERENT BODY TYPES



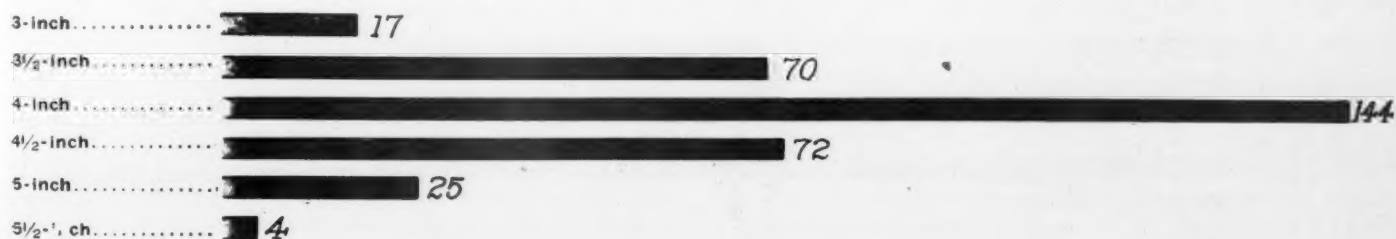
NUMBER OF CHASSIS IN DIFFERENT PRICE



DIFFERENT NUMBER OF WHEEL SIZES ON 188 CHASSIS



NUMBER OF TIRES OF DIFFERENT SIZES ON 188 CHASSIS



SOME CAR COMPARISONS

A graphic representation of some of the more important details of the licensed cars exhibited at the Madison Square garden show. This is based upon 188 chassis models shown by the A. L. A. M. manufacturers.

In the body diagram the figures at the ends of the lines are the actual number of bodies fitted on these chassis. In the price diagram the figures at the ends of the lines are the number of chassis falling under each price classification. In the wheel and tire charts the figures are the number of pairs of wheels or tires of the dimensions given.

On the opposite page are shown comparisons of some of the more important motor and chassis specifications. The figures at the ends of the lines are the actual number of chassis models showing these characteristics.

For instance, at the top of the page, it will be seen that there are 152 chassis models having four-cylinder motors, thirty-two with six-cylinder, three with two-cylinder motors, and one having a single-cylinder engine. These diagrams bring out the use of the different designs very forcibly. In the last diagram, for example, the preponderance of shaft drive over chain drive is very marked.



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Driving with the Mismatched Team

MANY car factories resemble a team of horses in which the one horse is pulling all the load and the other with its whippetree rubbing against the wheel is hindering the progress. It cannot be said that the one horse is balky; it cannot be said that it is lazy, but it is simply a case of poor team work—a poor combination, in which a giant is yoked with a pigmy. The net result of this is that the strength of the big horse is consumed in pulling the load and also in dragging his mate along. This condition in some companies exists today. One horse is the business department of the company, the other is the engineering department combined with the manufacturing end. A factory is only as strong as its weakest member, and no matter how strong the selling organization, if its engineering department is weak there cannot be ultimate success, because, like the mismatched team, the selling department will have to drag the engineering section along. There are cases where it has been the selling department alone that has kept some cars in their present positions, whereas other makes have reached the position they occupy through sheer engineering merit and in spite of a most inefficient selling organization, which, with a car of ordinary design, could not support itself.

IN contrast with the factory in which the selling organization is the strong horse, there have been those in the past in which the team, consisting of the engineering department and the business end of the industry, has resembled an elephant yoked with a calf. The engineering department has run rampant. The new model has simply been a semi-annual or annual manifestation of the whims of an engineer whose chief desire has been to satisfy some of his wild-oat conceptions of what a car should be. Needless to say that where a team of this nature was looked upon as the motive power of an industry that nothing but failure could result. There are today a few factories which are relics of what they once were and which might have been leaders had there been a proper relationship and proportion between the engineering and business departments. A giant engineering department hitched to an infant business organization is just as certain to meet with failure, and a little more certain than a masterful selling section yoked with a pigmy engineering department.

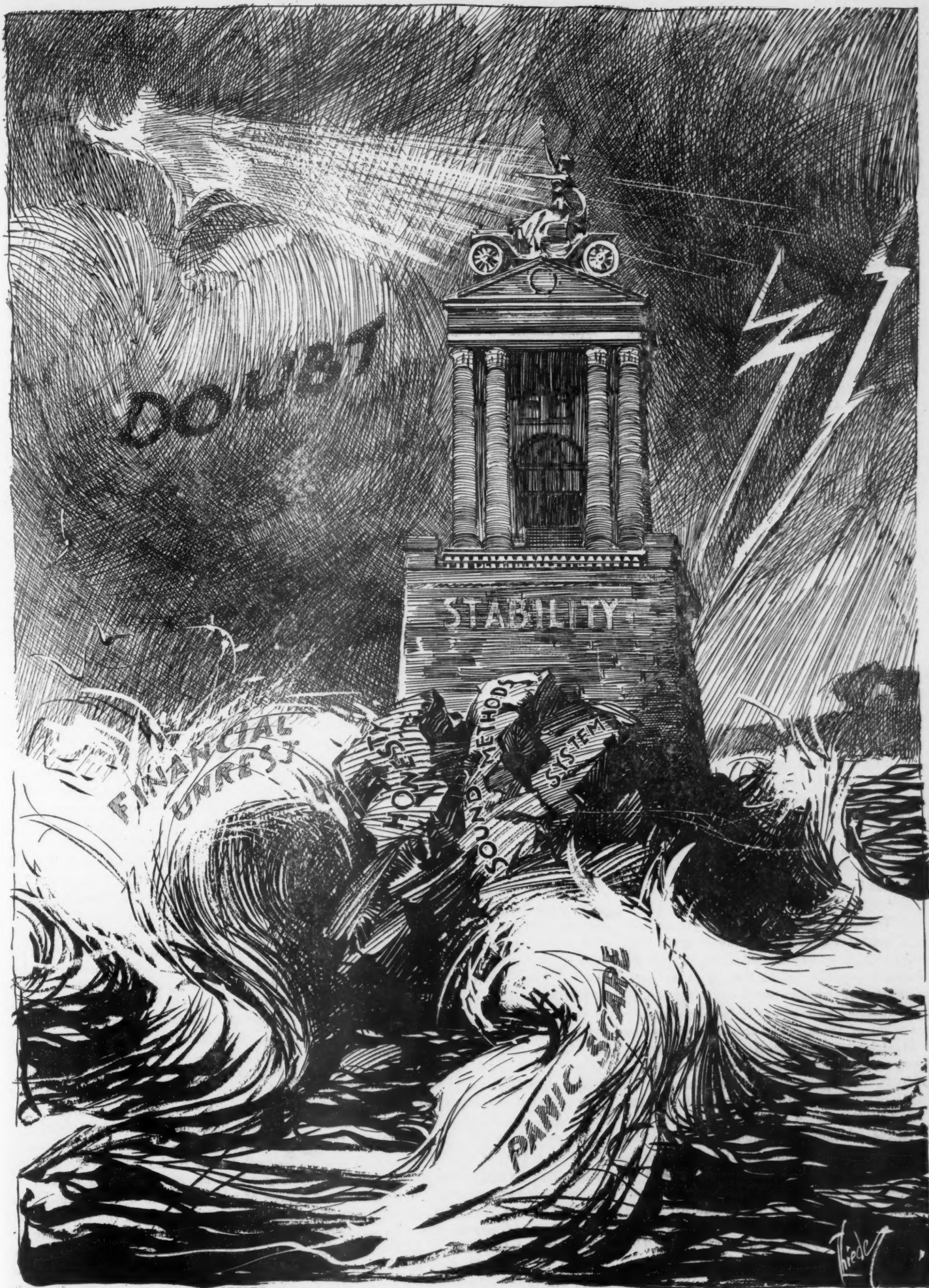
THE healthy factory is that in which the team is well matched; that in which both horses pull side by side; that in which the doubletree is always even up at each end; that in which, when a grade is met, both pull together; that in which, when going down a steep hill, both hold back with the same equal effort as they pull on the up grade; and that in which on the narrow, tortuous road one is as reliable as the other. Such ideal factories exist, and it is needless to say that they are establishing themselves more firmly with the American public and are gaining more regularly and more surely than any of the companies which drive with a mismatched team. It is a fact that some of our leading concerns have had their engineers hold new designs in abeyance for 6 months or a year when the engineering department wanted to thrust them on the public before any other company had a chance to do so. This playing to the grandstand may be good advertising for the engineer, but frequently it is not the thing for the company in the long run. The really strong com-

pany never retraces its steps, but before taking the step ahead it is certain of two things: First, that the new design is correct from an engineering standpoint, and adaptable to the motor car, and also that it is a design which the public is ultimately bound to accept. There have been excellent designs brought out by engineering departments which are correct from an engineering viewpoint, but which have bankrupted the factories. Which factory is the more valuable, that which exists as a producer of conservative goods, or that which plunges into the novelty field and soon is eliminated because of financial loss?

A MANUFACTURER must always realize that he has to sell his goods to the public and it is quite absurd to build even the most scientific product if it cannot be sold. It is all right to exploit such, but to turn the factory, body and soul, over to the production of the same is business suicide. That factory is to be commended which holds its engineering department in control, and before any new design is launched has thoroughly gone into the questions of whether it will be accepted by the public or not. The history of the last 10 years records a score or more wrecks brought about solely by the wildfire, rampant conceptions of the engineering mind, and which factory, unfortunately, had not a strong enough organization to control. With one factory the engineer saw nothing but a new type of cooling devices for the motor, and he would sooner the factory pass out of existence than that his device be changed; with another it was the employment of a certain design of gearset, or else cease manufacture; and with a third it was the rear axle or nothing.

THERE are factories that are erring on the other side, those that have perfected a design which has met with the approval of the public and which a strong selling organization has been able to dispose of. In such factories the engineering department is sleeping, but this cessation has not exhibited itself because of the strength of the sales department. The selling force has been so thoroughly organized and composed of such competent salesmen that the annual product has been disposed of in spite of the fact that it is gradually dropping behind in the question of design. Such factories will have to waken up. They are driving with a mismatched team, and while their treasuries may be well stocked at the present, and while it may seem impossible for financial difficulties to even cast their shadows around the precincts of such a factory, the inevitable is bound to come.

IN order that a factory works to its greatest advantage it is necessary that one department be held in restraint at times, and another spurred to its master effort. There are factories today in which the engineering departments are being held back in one line of enterprise, and being spurred to the maximum in another. What the rival manufacturer has designated as the most conservative manufacturer is today often proving the most aggressive. Some of these factories are changing from year to year, and their changes appear ahead of the times, but when it comes to selling, it is found that the improvements are what the public wants. This is brought about by a most alert selling organization, one which plucks the grass to see which way the wind blows, and which works with its ear to the ground, receiving the distinct and accurate throbbings of the public pulse.



Business Sagacity has its Reward

Changes in Pleasure Cars Made for the Coming Season

Alco Six and Four

THE Alco six-cylinder has been improved by carrying the decompressor handle out beneath the radiator at the left side of the chassis, where it is convenient to handle by the person cranking the motor. A new venturi-type carbureter is fitted in which the needle valve is raised in the nozzle through a diaphragm, which diaphragm is actuated by the motor suction. For the Bosch dual ignition system a 6-volt starting battery has taken the place of a 4-volt type of last year. The crankcase of the motor is now mounted horizontally in the chassis instead of being lower at the rear end as formerly. The radius rods between the rear axle housing and frame are now I-beam forgings. They are hinged at the front end and revolvably mounted on the axle forging at the rear. The four-cylinder Alco carries the several improvements as the six and has cylinders $5\frac{1}{8}$ by $5\frac{1}{2}$ inches, bore and stroke; these sizes were $4\frac{3}{4}$ by $5\frac{1}{2}$. This is one example of increasing the bore and leaving the stroke the same. All models are fitted with Continental demountable rims.

American Has New Models

A most important addition to the American lines is a coupe type with left-hand control, the emergency brake and change-speed lever being placed in the center of the floorboard, so as to be operated by the right hand. This model uses an underslung frame. In its regular chassis a few refinements have been made for this year. A Bosch dual ignition system is fitted, the cylindrical coil with switch being carried in the toeboard and flush with the surface. A kick switch is used on the coil. Rubber inserts have been placed in the clutch beneath the asbestos facing. A change in the gearbox is the introduction of spiral gears for driving from the main to the countershaft at the rear end of the case. This is expected to give quieter gears. Pressed steel brake drums are fitted on the rear wheels.

Amplex Has Air-Starting Device

The most important changes of the 1911 Amplex line comprise a lengthening of the wheelbase from 117 to 128 inches, increase of bearing surface throughout the motor, increased length of springs, and entire new design of frame. The frame is of pressed steel heat treated with very wide flanges, where the side members narrow down in front. The gear-shifting mechanism is entirely inclosed, with both levers inside the body. New style of oilers are fitted with means of increasing and decreasing the flow from the dash. Special attention is called to an air-starting device, which is standard equipment. This device consists of a combination air pump and air valve on the rear cylinder, with the three other cylinders equipped with air valves. The air is stored in a tank hung from the frame, from which it passes through a

Trend of Times Shows that Fore-Door Bodies Are to Be Popular with Buying Public Next Spring and Summer—Apparently Era of Standardization in Industry is Close

distributor or starter valve on the dash when the valve is operated by a foot push pedal conveniently located. Double ignition is employed, with a Bosch high-tension magneto to one set of plugs, and a Bosch independent synchronous battery system to another set. Shock absorbers are standard equipment, and a fore-door body may be fitted to all models.

Atlas Simplifies Oiling

The Atlas Motor Car Co., showing both pleasure and commercial vehicles, has simplified its oiling system by substituting a roller bearing for the plain bearing in the crankshaft connecting rod. These bearings, together with the pistons, are lubricated by putting a smaller amount of oil in the gasoline tank with the gasoline. The roller bearings prevent a possible sticking, require no adjustments and reduce friction to a minimum. The crankshaft is a one-piece drop forging of chrome vanadium steel. The revolving disks of the crankshaft have been eliminated, the charge being taken into the crankcase through a port in the center part of the crankshaft. All back firing and popping in the carbureter have been eliminated by corrugated plates put in the transfer point. The system of transferring a charge to the cylinders has been improved by piston heads with only two depressing channels and transfer ports in place of four. Also there are two exhaust ports. The cylinders are cast in pairs with the centers much closer together; the crankcase and ends are one aluminum casting, eliminating two joints, and the engine, clutch and transmission add a rigid unit of a three-point suspension.

Brush Has Larger Valve Jackets

Among the changes to be found in the Brush cars the waterjacket space around the valve chambers is increased so that the valves will be less affected by the heat. There is a slight change in the material used in the clutch disks, whereby greater wearing qualities and smoother action is obtained. The transverse tie-rod of the steering gear has adjustable yokes instead of brazed joints, the yokes now being threaded and locked by a clamping bolt. No other mechanical changes are to be found, except that the wheels on the roadster models have been increased from 28 to 30 inches in diameter.

Buick Has Few Mechanical Changes

The characteristic mechanical feature of the Buick cars remains unchanged for the coming season, except that an automatic high-speed clutch releaser is fitted to the models having the two-speed planetary gearsets; practically all wheelbases are changed;

the full-elliptic rear springs on the larger models have given way to semi-elliptics; wheel dimensions of the larger models have been increased from 34x4 to 36x4 inches; there are changes in the carbureter and magneto equipment; and a new chassis model is brought out which is equipped with a 4-inch square motor. The old two-cylinder model on which the Buick reputation was founded is not listed in the 1911 catalog. The features of the new model are a regular Buick valve-in-the-head type of motor; power is transmitted through a multiple-disk clutch.

Four in Cartercar Line

The Cartercar Co. will not invade the commercial realm this year, but offers four models, one a 40-horsepower, one a 35 and two 30s. The Carter friction transmission is a feature of the line, and in all four models various refinements are to be noted, although no radical departure from the conventional has been made by the Cartercar Co.

Cadillac Shows Many Refinements

Many refinements in details are to be seen on the Cadillacs. The cylinders have an increase in diameter so that the dimensions are now $4\frac{1}{2}$ -inch square instead of $4\frac{1}{4}$ by $4\frac{1}{2}$. A change has been made from the plain bronze crankshaft and connecting rod bearings used last year back to the babbitt-lined bronze bearings used in the 1909 models. The crankshaft is increased in diameter and the bearing surfaces longer and increased in area. The radiator is larger, and one-piece copper water manifolds have replaced the Ts on the cylinders and their series of rubber hose connections. Considerable changes and improvements are to be found in the double ignition system, one system being comprised of a Bosch high-tension magneto, and the other system being the Delco battery design with a high-tension distributor instead of a low-tension commutator, eliminating all moving wires. All high-tension cables are supported in copper tubes and protected from heated portions of the engine; the four-unit induction coil is eliminated and a single-unit coil mounted on the engine gearcase at the right front end of the motor beside the high-tension distributor. A larger and improved water-jacketed Schebler carbureter is fitted with an auxiliary air adjustment conveniently located on the dash. The flywheel is also larger and heavier, giving a greater degree of smoothness in operation and more flexibility of control. In the clutch, which is now removable without disturbing the gearset, a feature brought about by the adoption of two thoroughly incased universal joints between the clutch and gear-

by the American Designers Noted in Concise Form

Motor Age Points Out Just What Has Been Done in Way of Refining the 1911 Product—Not Many Innovations Reported by Makers—Latest Ideas Told in a Nutshell

set, the clutch yoke is redesigned so that only a very slight pressure on the pedal is required to release it, and the single clutch spring used on last year's model is now replaced by a series of six springs located on the outside on the webs of the clutch cone. In the rear axle the driving pinion and driven gear are increased in size and four and one-half-pitch gears instead of five pitch employed. The propeller shaft contains two universal joints instead of one, eliminating binding strains in the gears and a consequent possibility of gears getting out of adjustment and a triangular torsion rod is fitted to the rear axle instead of a torsion tube. The new rear axle is a floating type instead of semi-floating. The axle shafts are larger. The brakes are larger, new equalizers are employed, and general design has been improved so that only a very slight pressure on the pedal or lever is required to operate them. The steering gear is larger, as is also the steering wheel, which now has a hard rubber rim. A double drop frame is employed, lowering the center of gravity and giving a lower appearance to the car; the rear platform springs are fitted with a universal shackle without the ball joints, 36-inch wheels instead of 34 may be obtained if specified, and the wheelbase is 6 inches longer. In the engine control, sparking and throttle levers engage a smooth sector instead of a toothed one; an improved accelerator pedal is fitted and the spark and throttle connecting rods are fitted with adjustable ball joints.

Case Models New Ones

None of the 1910 Case cars has been carried over and the offering of this concern consists of a 30-horsepower chassis in which are larger and stronger timing gears. The camshaft and cams are a one-piece drop forging, while the timing gears are bolted to a flange which is solid with the camshaft. The camshaft and timing gear can be removed without dismantling the motor, while all the bearings are die-cast white bronze. The water pump is centrifugal type and with the magneto is located on the left side. The steering gear and carbureter are on the right side. Six different types of bodies are furnished on this one chassis.

Chadwick Motor Changes

Most of the changes in the 1911 Chadwick are found in the motor, the inlet valve being much larger and placed in the cylinder head, so that rocker arms are used to operate them. The company claims 15 per cent additional power by this construction. A heavier crankshaft is used because of this increase in power. The motor timing gears are of hardened steel and

the exhaust camshaft is fitted with a lever for shifting the entire shaft, including the gear, endwise, so as to bring an extra set of cams under the exhaust valve lifters to relieve the compression for starting. The capacity of the mechanical oiler has been increased to 2¾ gallons. A hot water-jacket has been placed around the inlet pipe to prevent condensation, the supply pipe for this water being carried through the middle of the intake manifold to get the greatest benefit from the heat. The distributor is now placed in front of the motor, where it is more accessible. The water pump has been transferred to the left side.

New Columbia Model

Most important in the Columbia is a new model mark 85, in which a double set of jump spark ignition has taken the place of the low-tension make-and-break system heretofore used exclusively on these models. Two sets of spark plugs are used, the one set receiving its current from the Bosch magneto, the other from a battery through a timer distributor and a Bosch non-vibrating coil. An elaborate circulating system of lubrication is used, in which the oil is pumped to the three crankshaft bearings and the timing gear compartment. A cork float carrying an indicator shows the oil level in the crankcase. The motor, with its 4⅞-inch bore and 5½-inch stroke, has a right to be entered in the longstroke classification, in that the stroke exceeds the bore by ⅞-inch. On the mark 48 Columbia, which model is continued from last year, the Bosch low-tension ignition system is maintained, but a high-tension set also fitted, consisting of a battery, single-unit coil and timer distributor.

Chalmers Well Simplified

The Chalmers improvement menu divides itself between the 30 and 40 models. This concern now builds practically 75 per cent of its own motors for both chassis. The model 30 improvements are: Pushrods are heavier; each cylinder carries a larger priming cup; cylinders are enamelled in the company's own plant; the wiring system in the double ignition system is simplified, the magneto wires being carried in a vertical tube at the center of the cylinder casting and the battery wires in a horizontal tube on the opposite side. In the transmission the propellershaft is now made with two universal joints, and is paralleled by a pressed steel torque rod. Last year one universal was used and the propellershaft was within a torque tube. A new rear axle with a pressed steel housing has been added. It is of the complete floating type. The dash has been cleaned up, its only appurtenances being a glass

bull's eye scarcely 1½ inches in diameter, which serves as a sight feed and the circular end of the Bosch coil, which carries a lock switch. The dash is now square; it was oval. Front and rear fenders have been made specially strong by stout forged brackets which are of V design and have branches extending the complete length of the fender. The mud pan and many other car parts, which heretofore were painted, are now enamelled. In the Chalmers 40 a Bosch dual ignition system has replaced the double system. A strainer is fitted in the gasoline line between the tank and carbureter. There is a new universal joint between the clutch and gearbox and it is lubricated by a grease cup placed on the floor of the car in front of the driver's seat. All valve springs are encased. The spark and throttle controls on the steering wheel work on a plain semi-circular ring, being held in position by friction. Last year the semicircle had a serrated edge. The steering column is heavier. The fender and dash improvements of the 30 are incorporated on this model.

Corbin Has a New Model

This concern has brought out an entirely new model which differs from the 1910 type in the following respects: The cylinders are of the T-shape type cast in pairs. A complete circulating oiling system with the flow maintained by a circulating pump driven by bevel gear from the rear end of the camshaft. This gives force feed to the three crankshaft bearings and the lower bearings of the connecting rods. A splash system is not used, the crankshaft, the cylinder walls and wristpins being oiled from the oil thrown from the crankshaft. In the gearset the gears and shafts are now made from chrome nickel steel. A new rear axle design is used, made up of a pressed steel housing, formed in halves, which are electrically welded together. The differential and pinion with shaft are mounted as a unit in a casting which bolts into the axle housing. A change has been made in the support of the motor, which is now hung direct on the side members of the frame instead of on a steel pan as done last year. Last year the gearbox was carried on this steel pan but is now carried on two cross members of the frame.

Elmore Distributer Adjustable

The model 25 is a new addition to the Elmore line, and a number of improvements are found in the model 36-B, which was brought out last year. Means are now provided for regulating the timing of the gas distributor ports, so that a greater economy in fuel is obtained; the screens have been removed from the gas passages. A high-tension K. & W. magneto system has been added to the single Atwater-Kent system previously employed, so that there are now two independent ignition systems. Improvements are to be found in the car-

bureter design, a hot-air pipe extending from a jacket on the exhaust manifold to the air intake of the carbureter replaces the exhaust gas jacket used heretofore; a needle valve adjustment previously located on the dash is now in a convenient position directly below and in front of the driver's seat, means are provided for flooding the carbureter by pulling a wire which extends through the radiator instead of choking the air supply, a notched quadrant is mounted over the steering wheel for the control levels, and the flat design of the carbureter is improved. A new priming device is fitted to the motor by means of which all the cylinders can be simultaneously primed by merely operating a rod on the dash. The exhaust manifold is slightly changed. The expanding-ring clutch, previously used, is now replaced by a multiple-disk type arranged in unit with the gearset, its disks being of bronze and steel with cork inserts and lubricated by the grease from the transmission; it has no springs or adjustments on the inside, and the operating lever is a sliding instead of a rocking type; three-point suspension is a feature of the unit clutch and gearset. A change is found in the gearset in that both shafts are now arranged in the same vertical plane instead of a horizontal one, and New Departure ball bearings replace the plain roller bearings used last year. The steering gear is a worm-and-nut type instead of a bevel-gear design. The steering wheel is larger; oiling caps are fitted on all spring shackles, and the wheelbase is increased from 110 to 115 inches.

E-M-F and Flanders

Roadster and demi-tonneau styles of bodies are something new with the E-M-F Co., which, however, has not changed the chassis except to give a lower angle of rake to the steering column of the two new models. The roadster has bucket seats and a large gasoline tank in the rear, while the demi-tonneau differs from the roadster only in the seat arrangement, a tonneau accommodating two persons being substituted in the rear in place of the large gasoline tank in the rear locker. In this model the tank occupies a position under the front seat. A scuttle dash is used on both these models. The Flanders, also made by this company, has been refined and improved for 1911, and comes in runabout, roadster, suburban and coupe types.

Everitt Chassis Unchanged

Satisfied with the chassis brought out last year, the Metzger Motor Car Co. has devoted its time to filling out its line by equipping the car with six distinct styles of bodies, taking in the popular ideas ranging from a roadster to a fore-door touring car, and also including the light delivery wagon. A feature of the Everitt idea of the fore-door construction is the fact that everything is inclosed and the only thing shown outside of the car is the door handle. The control levers are within easy reach of the driver and have sufficient

clearance to overcome any chance of striking the door. In the chassis few changes are noted, the company still continuing the long-stroke motor with the cylinders cast en bloc. One of the features here is that the magneto and pump supports are cast en bloc with the upper half of the crankcase and do not need to be disturbed when removing the lower half of the crankcase. The valves are in pockets and are all on the left-hand side of the motor, being most accessibly located.

Franklin Bodies Changed

The hood is a new Renault type with open grill in front instead of the round design used heretofore. The side doors used in the 1910 air jackets of the Franklin motors are eliminated, the sides of the hood itself taking the place of the sides of the suction chamber when the hood is lowered. In the motor there are now two separate valves in the head of each cylinder, arranged side by side and operated by rocker arms instead of the concentric valve design on last year's models. The trombone design of intake pipe, heretofore employed only on the six-cylinder motor, is now used on all models. The shafts of the engine gears at the rear end of the motor are mounted on the rear motor support, which is further to the rear and has a deeper vertical flange. In the lubrication system there is a lead to each of the main crankshaft bearings instead of to the splash chambers of the crankcase; the crankshaft is drilled to form ducts for the lubricant to the lower connecting-rod bearings, and oil caps have replaced the plugs heretofore used on the steering mechanism. The magneto is more accessibly located, the spark plugs are placed vertically in the heads of the cylinders instead of at an angle, and the magneto is held in place by a strap and thumb screw, making it more readily removable than when fastened into place with cap screws. The fiber conduit, which on last year's cars was above the intake manifold, is now a brass tube situated between the upper and lower portions of the intake manifold. Trap doors have been fitted in the mud pans to facilitate carbureter adjustment; and on the six-cylinder models the carbureter has an auxiliary air valve and an accelerator. Semi-floating axles are used on all models, and the annular ball bearings, previously used at the axle ends, have been replaced by Timkens, with compression grease cups for their lubrication. The wheelbases of all models have been lengthened, model H being changed from 127 to 133 inches, model G from 91½ to 100 inches, and model D from 106 to 123. Changes are also to be found in the cylinder dimensions. Model H cylinders are changed from 4¼ by 4 to 4½ by 4½; model D from four cylinders 4¼ by 4 to six cylinders with 4 by 4-inch dimensions.

Garford Car Complete

For the first time in its history the Garford company has built its own bodies, having built a special building for this

work and purchased a body building concern which it has moved, with the laborers, to its factory. The Garford chassis has been altered in several minor respects. In the motor a V section fan belt has replaced the flat type. The floating rear axle is a tubular construction, each axle sleeve being a funnel-shaped seamless steel tubing which bolts at its larger end to the differential housing, braking not entering into the make up of the axle in the present form.

In the latest Haynes models all valve springs are encased. Engine and gearset gears are ground and cylinders are both ground and lapped. In the cooling system the water pump has been located more accessibly by raising the shaft a trifle, which drives it and the magneto. The fan adjustment is improved. The radiator is 1½-inch higher. There is a ring around the fan blades to increase their rigidity. Slight changes are found in the oiling system in that a large glass, showing the oil level in the crankcase, is situated at the right front of the case; and the return pipe of the sight on the dash passes directly downward through the floor board. The filler pipe, located on the leg of the engine in last year's model, is now conveniently located between the cylinder castings. A Bosch dual ignition system is fitted with a new combination coil and switch passing through the dash, which is provided with a lock. A Schebler carbureter is used. The frame is longer, the steering gear adjustment more accessible, improvements are to be found in the brake construction, wheels are heavier, and the wheelbase increased from 110 to 114 inches.

Hudson in Entirely New Dress

The 1911 Hudson is an entirely new car. It is characterized by a monobloc four-cylinder motor, with valves on the left side. This motor has a cross shaft in front on the left end of which is the water pump, and on the right end the magneto. The gearbox is a unit with the motor, being anchored thereto through a pair of spreading arms which surround the flywheel and bolt direct to the rear of the crankcase. The gearbox has no other support, so that it is a unit with the motor. An interesting point about the water system is that the pump delivers the water into the jacket at the front end of the valve chamber so that the cold water is brought direct in contact with the exhaust valve seats, which is the hottest part of the motor. The top of the water jacket is a large casting which forms the return water pipe, which design gives a very large volume of water above the cylinder head. In the ignition system the wires are carried in a horizontal tube over the cylinder heads, this tube extending rearward until almost end to end with the cylindrical Bosch coil, which extend through the dash. Where the wires from the coil to the end of the tube are exposed there is a conical-shaped rubber sleeve, fitting over the coil and

also over the end of the tube, so that water could be thrown over the coil or tube without danger of short circuiting. The carbureter is at the opposite side of the motor to the valves, and the intake pipe passes through the waterjacket between the second and third cylinders. This heats the pipe and avoids condensation of the mixture.

Hupp Has a New Model

For the season of 1911 a new model has been added to the Hupmobile line, which is a four-passenger touring car built identically the same as the 1910 Hupmobiles, except that the propellershaft, radius rods and frame are lengthened and increased in strength to meet the demands necessitated by the longer wheelbase, which is 110 inches. The other Hupp models have wheelbases of 86 inches. Power is furnished by the same four-cylinder unit power plant which has been characteristic of Hupmobile construction since its invasion of the field three seasons ago. The general design of the motor remains unchanged except for slight improvements toward increasing the car's durability. The tension of the clutch spring is now made adjustable by using three plugs which screw into the end of the clutch hub and bear against the end of the spring and listing of the car to one side is done away with by using a single inverted spring leaf, which is secured to the top of the rear spring, and has its ends bear up against the under side of the rear frame member.

Inter-State Has a New 50 Model

The Inter-State 40 models previously manufactured are continued through 1911, but with several slight mechanical changes and several new body types have been added. To meet the demand for a large touring car a new chassis model has been added, which is known as the model 35. This is equipped with a torpedo touring car body of a roomy fore-door type. The features of this new model are a water-cooled T-type motor with a 4 $\frac{1}{4}$ -inch bore and 5-inch stroke, which is claimed to develop 50 horsepower at a normal speed of 1,200 revolutions per minute. The cylinders of the motor are cast in pairs, mounted on a crankcase having three-point suspension, the forward end being suspended by a trunnion from a channel pressed steel arch. Cooling of the motor is assisted by a centrifugal gear-driven pump, a cellular radiator and adjustable belt-driven fan. Lubrication is by means of a circulating oiling system. Ignition is by means of a double jump spark system with a timer driven by bevel gears off the intake camshaft, and the magneto driven from the rear end of the water-pump shaft. A multiple-disk clutch in unit with a selective gearset giving three forward speeds transmits power through a drive-shaft inclosed in a torsion tube to the full floating type rear axle.

In body styles the Jackson offers a convertible torpedo body, which can be con-

verted into a fore-door type because the front doors are removable. The Jackson company retains the unit power plant idea throughout and the circulating system of oiling again is a feature. The frames on models 51, 41, 35 and 30 have been dropped, bringing the weight close to the ground.

The most important change in the Kisselkar construction for 1911 is to be found in the oiling system, the mechanical oiler having given way to a self-contained circulating system with an adjustable oil level, and a glass float indicator is provided at the left side of the crankcase to show the level of oil in the reservoir. A foot accelerator is fitted to all models except the LD 11. Clutch-operating pedals are adjustable. An improved universal joint encased in leather and packed in grease is employed between the clutch and gearset. Brakes are of the external and internal type, instead of two internals located side by side, and the braking surface is practically doubled. A double drop frame replaces the single drop construction. The steering gear tire rod is located behind the rear axle, and the steering arms above it. Wheel dimensions are changed from 36 by 3 $\frac{1}{2}$ front and 36 by 4-inch rear to 36 by 4 all around, and the wheelbase is increased from 120 to 124 inches. In the model LD 11, the same changes exist as in the motor, clutch, frame and steering gear of model D 11, and in addition the gear-shifting levers are placed outside the frame to facilitate operation. Wheelbases are changed from 112 to 116 inches. The 50-horsepower four-cylinder car is discontinued, and the six-cylinder model F is the same as model F of 1910, except that a new six-cylinder motor replaces the four-cylinder engine, and the wheelbase is changed from 124 to 132 inches for the approaching season.

Knox Shows but Few Changes

Among the few changes to be found in the new Knox cars is a heavy I-beam arched cross member which is arranged across the frame at the rear end of the motor above the crankcase. The object of this is to make this portion of the frame more rigid and avoid the squeaks that would occur occasionally between the dash and the body, due to contortions of the frame when the car is traveling over uneven roads. A slight change also is to be found in the shifting mechanism of the gearset in that the cross rod from the levers to the top of the gearcase extends across the top of the case, thus the bearings are farther apart and binding is avoided. A full floating rear axle, such as was used on the six-cylinder models of 1910, is now fitted on all four-cylinder models as well; new brake band supports of an anti-rattler spring design are fitted to hold the brake bands away from the drum when not in use, and a triangular torsion tube is added to relieve the springs of torsional strains and improve the riding qualities of the car. The wheelbase

in the four-cylinder model is lengthened from 117 to 122 inches, and on the model S six-cylinder cars the 36 by 5-inch tire equipped wheels are replaced by wheels having 38 by 5-inch tire dimensions.

Lambert Uses Friction Drive

The Lambert company is so well satisfied with the success it has met with friction transmission that the same idea is retained for 1911, with only one or two minor changes. There are four chassis types, which carry six different models, which are alike except that in model 100 a four-cylinder Rutenber motor is used, while in the other models the four-cylinder engine is of the en bloc type with ball-bearing crankshafts. This model 100 is practically the same as model 47 of 1910, except that the frame is reinforced with truss rods and external-contracting emergency brake is found on the rear wheels; folding trunk rack is fitted, and the hood and radiator are larger and of the torpedo type. Slight improvements are found in the other models in this line.

Locomobile New Six

The leading change in the Locomobile four-cylinder 30 is installing of the Bosch dual high-tension ignition system, this being the first year in which this company has used the high-tension system, having previously fitted the low-tension make-and-break exclusively. A new carbureter is used, which has a control on the dash by means of which the tension of the two springs controlling the auxiliary air valve is regulated. A change in the rear axle is that the pinion shaft at the rear end of the propellershaft has a double ball bearing in front of the pinion, whereas last year it had one ball bearing in front and another in rear. The bearing in the rear has been discontinued. Heretofore the external brake bands were in one piece; now they are made in halves and pivoted at the rear. A new drop-forged spring shackle is employed at the rear end of the back springs. This shackle has an integral crosspiece at the top, which prevents turning of the spring. The biggest feature of the 1911 line is the new six-cylinder, the motor of which in general designs follows that of the four using the same bore and stroke. The cylinder castings are made with larger waterjacket spaces and the valves are of greater diameter than in the four. A circulating oiling system is used, the gear oil pump delivering the oil into a very small trough under each connecting rod. The governor on the carbureter has been dropped. It uses high-tension ignition. A multiple-disk clutch is used for the first time by the company. The same gearbox and rear axle construction as used on the four-cylinder is fitted.

Lozier Has Compression Release

The six-cylinder Lozier motor has been improved by the installation of a compressor release which holds the exhaust valve open to assist in starting. It is controlled by a handle in front of the

radiator. The steering column is carried in a Hess-Bright ball bearing in the dash, which makes its movement much easier. Valve caps are now threaded into the tops of the valve cages; heretofore the intake and exhaust caps for each cylinder were held by a crow-foot yoke. The valve diameter has been increased. A neat body feature of the Lakewood model is that the tonneau door on the left is hinged to the body still and swings down and out forming an emergency seat for the chauffeur. When not in use the seat has every appearance of a door. On the four-cylinder model the leading change has been increasing the stroke from $5\frac{1}{4}$ to 6 inches. This brings the Lozier motor up into the long-stroke class. This model also carries the compression relief and the ball bearing steering post.

Marmon Slightly Changed

But few changes have been made in the one Marmon chassis for next year, the most important alteration being an increase in the valve diameter from $2\frac{1}{4}$ to $2\frac{1}{2}$ inches, and increasing the wheelbase from 116 to 120 inches, bringing about a trifle more power and easier riding qualities.

Several Matheson changes have been made, one being a new coupling between the clutch and gearset, which carries a ball bearing intended to steady the rear end of the clutchshaft as well as taking the thrust of the clutch spring. This bearing is carried in a bracket on a cross member of the frame. The universal joint construction is squared and slides in a square hole in the coupling, thus providing a slip joint. A universal type of coupling has also been fitted in the pump shaft. A V-cross section design of fan belt is added. On the four-cylinder Matheson, which heretofore has used low-tension ignition exclusively, an option of a high-tension Bosch system is offered. The drive chains on this model are encased.

Midland Has but Few Changes

But few changes are to be found in the Midland line for 1911. Model L2 is an evolution of the 1910 model L with the same specifications as model L1 except that it is equipped with a fore-door body. All cars have the Midland unit power plant of 40-horsepower. They are equipped with the Rayfield carbureter, Splitdorf magneto, an oil feed indicator and new style foot accelerator pedals in a divided footboard, all of which are changes or additions made for 1911.

Mercer Uses New Motor

The Mercer cars for 1911 are a continuation of the 1910 designs with two changes, namely, the fitting of new motors and new rear axle. The type 30-C carries a Continental motor, and the 30-M a new Mercer type of motor. On both a floating axle replaces the semi-floating type of last year. The new Mercer motor is a T-head design with cylinders cast in pairs and water-cooled. The valves are large, being $2\frac{1}{4}$ inches in diameter with $\frac{7}{16}$ -inch lip. Rocker arms are interposed between the

cams and the bottoms of the valve-lifter rods. A circulating oiling system is installed, there being a 2-gallon reservoir in the crankcase base. Dual ignition system is fitted. In the transmission is a multiple-disk clutch and three-speed selective set. In the new rear axle annular ball bearings are used, and gears and shafts are of chrome nickel steel.

Big Line of Maxwells

The four Maxwell chassis brought out for this year will accommodate thirteen different types of bodies. The Maxwell features—unit construction, three-point suspension, thermo-syphon cooling and multiple-disk clutch—are retained and in addition all models are equipped with magnetos. The two-cylinder Maxwell, which long has been one of the concern's stand-bys, is retained. The body styles offered by the Maxwell include open front and fore-door touring effects, straight line torpedo, close coupled and light touring styles, surreys, runabouts with single rumble seats, runabout with flat deck and tool box in the rear and torpedo roadster.

Long-Stroke Motor in McIntyre

Improvements in the McIntyre pleasure cars have brought about the use of heavier axles throughout and the adoption of a long-stroke motor. New metal body designs have been adopted and a magneto is used. All the models are equipped with new springs, three-quarter platforms being used in the rear. The McIntyre motor is a four-cylinder proposition, with the cylinders cast singly but bolted together, giving an en bloc effect.

Mitchell with Many Refinements

There have been several changes on the Mitchell motors. In the water system hose connections are now used, taking the place of castings. A length of hose connects between the pump and the waterjackets and other lengths between the jacket heads and the radiator. These hoses clamp to brass unions, which thread into the cylinder castings, giving a neat construction. The oil filler for the circulating oiling system is now accessibly located on the right front motor arm. The exhaust valve cages are held in place by a threaded ring instead of by the yoke-and-bolt method. The four-cylinder models are now manufactured with a circulating oiling system, in which the crankcase has the usual reservoir in the base. A plunger pump actuated from the camshaft circulates the oil. The overflow standpipes in the crankcase compartments are adjustable from the outside, so that the oil level may be regulated in this way. The fan is now a one-piece aluminum stamping. Between the magneto and water pump is a new coupling, which allows of correcting the magneto timing without removing the magneto. The crankshaft on all models has been increased in diameter from $1\frac{1}{8}$ to 2 inches. The frame construction has been greatly strengthened, the frames on the two four-cylinder models being as heavy as that used on the six-cylinder one.

The radiator is now carried in an inverted channel cross member. The subframe members are supported at their forward ends by stampings which form a corporate part of the side members of the frame. The rear cross member is extended beyond the side pieces, forming a bracket to which the three-quarter elliptic springs clamp. The cover of the gearbox is a one-piece stamping, retained by a yoke controlled by hand wheel. The torsion tube enclosing the propeller shaft is greatly strengthened by webbing and has an inspection opening at the rear end, where the bearing carrying the pinion shaft can be adjusted. The propeller shaft is now made in three parts, giving a universal action if need be. Brakes have been increased from 14 to 16 inches in diameter.

Moline Uses Long Stroke

By far the most important change in the Moline chassis is the lengthening of the stroke, which has been changed from $4\frac{1}{2}$ to 6 inches, this making the Moline motor the leader of the long-stroke ones in America. Two independent ignition systems are fitted, one a magneto, the other a battery with distributor on a short vertical shaft at the front of the crankcase. The wheelbase has been increased from 112 to 117 inches. A lower body carriage is obtained by dropping the frame side members $2\frac{1}{2}$ inches in front of the rear axle. These side members are now offset at the dash; heretofore they have been straight from end to end, and the body set outside of them, whereas for this year the body sills rest direct on the frame. The frame stock is now $\frac{3}{4}$ -inch; it was $\frac{5}{16}$ -inch. Rear brake drums were 10 and 12 inches in diameter for the internal and external sets, and are now $13\frac{1}{2}$ and 14 inches, one drum sufficing for the internal and external sets. The bearings in the front wheels are heavier; they are of the cup-and-cone type, with $\frac{5}{16}$ and $\frac{3}{4}$ -inch balls; they used to be $\frac{1}{2}$ and $\frac{5}{8}$ -inch ball sizes. Nickel steel is used in the gears and shafts of the gearset as well as the pinion and bevel in the rear axle.

Moon Carries Improvements

On the Moon model 30 the motor weight has been reduced 72 pounds, and the horsepower increased by changing the valve opening from $1\frac{1}{8}$ to 2 inches and increasing the valve lift 1-16-inch. Rollers on the lower ends of the valve lifters have taken the place of the mushroom ending. Instead of spur gears used in the engine to drive the camshaft, helical ones are fitted. A multiple-disk clutch has superseded the band type. An improved worm-and-gear type of steering gear has taken the place of the gear-and-sector design of last year. The wheelbase has been increased 4 inches and this extra space utilized in the tonneau. The model 45 motor has been simplified in the matter of magneto and water pump drive. These are carried on a transverse shaft at the front of the motor. The mechanical oiler has been taken off the dash and located on the crankcase.

Three-quarter scroll elliptic springs have superseded elliptics in the rear, and the drive between the rear axle and the frame is through the springs.

National Has Motor Changes

A lot of motor refinements are shown on this car. The replenishing of the motor oil supply is facilitated by a large filler pipe with spring-retained cover. Carbureter adjustment is facilitated in that the eccentrics for changing the adjustment of the needle valve are to the outside instead of the inside, as formerly. The carbureter support is also reinforced by a bracket between the carbureter and the crankcase. The installing of a float within an oil well in the crankcase and carrying an indicator at the left rear corner of the motor afford ready indication of the oil level. The fender construction has been strengthened in front and rear, the bracket being a Y type, the ends of the Y supporting the fender at practically one-third the distance from each end, and having branch parts extending beneath the fender. The gearbox is now hung so that it can be dropped from the chassis without removing the body. In the intake manifold, the auxiliary air controller from the steering column is a poppet type of valve, instead of a sliding design. The poppet type may be ground to perfect seating should air leakage start here. Each cylinder head now carries an aluminum cover plate, which facilitates cleaning of the jackets. The cams in the motor have been made larger, giving more speed.

Oldsmobile Has T-Head Motor

A most radical change in the Oldsmobile construction over that of 1910 is to be found in the motor. The L-head design has given away to T-type cylinders, the cylinder dimensions are increased from 4¾ inches square to 5-inch bore and 6-inch stroke, and the valves have been enlarged from 1¾ to 2¾ inches. The engine gearcase, which in last year's motor was a separate casting, is now an integral part of the motor crankcase, and lubrication of the engine gears is by means of oil admitted through an internal lead from the main engine supply. The oil pump, which in 1910 was on the left rear end of the crankcase, is now very accessibly arranged at the upper central portion of it and driven by bevel gears off the camshaft. In the cooling system the fan belt is driven off the front end of the magneto shaft instead of off the crankshaft, and the pulleys are in front of the fan instead of behind it, so that a change of fan belts is greatly facilitated. The water pump is now on the left front portion of the crankcase instead of on the right side, to promote accessibility and symmetry of the external features of the motor. There is an indicator gauge on the dash to show the amount of pressure in the gasoline tank, a new carbureter is fitted to the motor to give a wider range of adjustment, and the intake and exhaust manifolds are exceptionally large and of sim-

pler design. An improved Bosch dual ignition system is employed. The flywheel and clutch cone are larger in diameter and thermoid facing is used instead of leather. A universal joint of the sliding block and yoke type is replaced by a plain double universal of heavy construction. The drive shaft is inclosed in a torsion tube and has but one large universal point encased in a large ball-and-socket joint, where the tube is connected to the rear end of the gearcase.

Ohio Uses New Axles

The leading mechanical change in the Ohio models is the fitting of improved front and rear axles, the former being an I-beam type with extra large end yokes and ball thrust bearings at the top of the yoke and mounted on tapered rollers. The rear axle is a floating design with a pressed steel housing, with annular bearings carrying the differential and wheels. The company has dispensed with the torque tube, which in 1910 enclosed the propellershaft, and has in place fitted a propellershaft with two universal joints. A triangular torsion rod parallels the propellershaft. A line of torpedo bodies with inside control has been added.

Overland Has Many New Models

Among the changes four new chassis models are to be found in the Overland line which were not made last year, and as for the changes in the models which are continued from the 1910 season the intake gas manifold of the motor is simplified in design, carbureter equipment is optional, the valve push rods are improved so that oil leakage therefrom is avoided. A distributing reservoir is located at the top rear side of the radiator, so that the incoming hot water is fed to a much greater number of radiator tubes at the top of the radiator and the cooling efficiency greatly increased thereby. There is also a change in the radiator design, in that the top is now a semi-circular instead of semi-hexagonal with rounded corners. In the clutch the large single clutch spring is replaced by three adjustable outside springs located on the clutch spokes. The gearset cases as well as the mechanism on all cars have been reinforced and are heavier and stronger in construction. As for the changes in the new models over the old ones, there is a slight difference in cylinder dimensions, making the motors larger and more powerful; double ignition systems are fitted with a Bosch magneto; there are screens on the front of the radiator to give a honeycomb effect. The universal joint between the clutch and drive shaft is inclosed and runs in grease, and there are differences in the wheelbases as shown in the specification tables.

Oakland Is Practically Unchanged

There are but few mechanical changes to be found in the Oakland cars for 1911. On the 40-horsepower motor the magneto is set vertically and the cylinders and motor parts are polished and refined in detail. Radius rods have been fitted, which extend

from the spring perches of the rear axle to the rear of the gearcase housing. A new fore-door body will be included, and there will be a four-passenger car with a half fore-door body, the same as on the five-passenger 40-horsepower.

Pierce-Arrow Longer Strokes

On the Pierce-Arrow six-cylinder line several changes have been made. All motors are now fitted with the Pierce-made power air pump for inflating the tires. An accelerator pedal has been fitted for the first time. A rectangular-shaped metal tube, carried above the return water pipe, acts as a conduit for the wires from the magneto to the plugs. Two brackets are placed on the radiator base to carry the license number plate and every body is fitted in the rear with an electric lamp to illumine the license number. A priming system is fitted to the motor by means of which gasoline can, by a pump on the dash, be sprayed into the intake manifold to facilitate starting. One stroke of the plunger pump takes gasoline from the line and forces it through a four-point nozzle into the center of the manifold. Approximately one tablespoonful is injected in this way. The hood has not to be raised to do the priming. The clutch facing on the cone is German bronze, which has taken the place of leather. Fabric heretofore used on the brake shoe faces has been replaced by German bronze, which has great wearing qualities and is quiet in operation. The brake diameters on all models have been increased. Two of the motor sizes have been enlarged as follows: Six-36 is 4 by 5½ inches; it was 4 by 4¾. Six-48 is 4½ by 5½; it was 4½ by 4¾. But Six-66 remains the same, namely, 5¼ by 5½. On the left running board an extension has been made to the battery box, forming a compartment for light tools and an oil can. On Six-36 the tire sizes on all models are 36 by 4½. In the limousines an automatic telephone has taken the place of the cumbersome speaking tube.

Peerless Shows Many Refinements

In the Peerless cars motors are increased from 4¾ by 5½ to 5 by 5½, and valves have narrower seats of a less acute angle, so that the liability of carbonization of the valve seats is reduced. The clearance between the valve stems and push rods is also reduced from .025 to .005 of an inch. The ball bearing previously used on the forward end of the crankshaft is replaced by a plain bearing to increase rigidity of crankshaft, the crankcase is of heavier construction, the external leads to the cylinders have been eliminated from the oiling system, all internal motor mechanisms except the front engine gears being oiled by splash, and the five sight feeds on the dash have been reduced to two in number. Carburation is improved by adding a spring attachment to the auxiliary air valve, and starting of the motor is greatly facilitated by a priming device operated from the front end of the car. This priming device consists of a plunger pump, by

means of which fuel is drawn from the float chamber of a carbureter and sprayed into the mixing chamber. A novel feature of the new car consists of a four-cylinder tire pump mounted externally on the left front end of the gearcase and provided with a clutch mechanism controlled by a lever extending through the side member of the frame, which engages the crankshaft of the pump with the countershaft of the gearset. Lubrication of all moving parts about the entire car is rendered more convenient. An improvement is to be found in the torsion rod bracket. Readily adjusted anti-rattling devices are fitted to the brake bands. The frame is provided with bushings to prevent wear of the insulation of electric wires. The wheelbase is lengthened from 122 to 123 inches on the four-cylinder models and from 136 to 137½ on the six-cylinder models. The tires on the six-cylinder models are now 36 by 4½ front and 37 by 5 rear and interchangeable, while on the last year's models the dimensions were 36 by 4 front and 36 by 5 rear. Grease cups instead of oil cups are an integral part of all spring shackle bolts, and many other little refinements in detail are to be found on the car, all of which add very materially to its total value.

Pope-Hartford Accessories Rearranged

In the Pope-Hartford cars for 1911 a general rearrangement of the motor accessories is to be found. The cylinder dimensions are changed from 4½ to 5½ inches to 4¾ by 5½. Valves are larger, compression grease cups are fitted to the rocker arm bearings, ball joints are provided at the upper ends of the push rods, and the rocker arms are of heavier construction. Ignition is by means of an improved Bosch dual system, with a combination coil and switch passing through the dash, and the cylinders are tapped for two sets of plugs, so that double ignition may be used if desired. The magneto is now at the right front end of the motor in a most accessible position and driven off a transverse shaft and worm gears from the shaft on the left side of the motor that drives the water pump and mechanical oiler. The carbureter is also shifted to the right side; a foot accelerator is added, the exhaust and intake piping is changed about, and the whole rearrangement makes for greater accessibility. The clutch operating mechanism is redesigned so that a pair of large Hess-Bright bearings designed to take the clutch thrust are now at the top and bottom of the clutch yoke, instead of at the sides. The yoke is pivoted on the left side member of the frame and the leverage obtained in the new design greatly reduces the energy required for its operation. A large universal joint is employed between the clutch and gearset; the clutch pedals operate through holes in the footboard instead of slots, and the pedal shanks are adjustable; the gearset is redesigned, giving four speeds forward instead of three, and the gearset brake is

eliminated and external brakes added on the rear wheel drums. The straight frame has given way to a drop construction, and front axle steering knuckles are fitted with Timken roller bearings at the upper ends of the vertical shafts.

Premier Has Circulating Lubrication

Among the changes to be found on the new Premier cars the replacement of the simple splash lubrication system in the motor by a circulating system is one of the most important. A gear oil pump situated at the right rear corner of the crankcase and gear, driven off the camshaft, forces oil through a large main pipe arranged along the outside of the case at the right to troughs into which the connecting rod scoops dip. In the cooling system the fan is reversed, the fan bracket being turned around so that the fan is now closer to the cylinders than the radiator, enlarging its scope of action. The fan belt pulley is just behind the radiator and is now driven off a pulley on the front end of the magneto and water pump shaft instead of at the rear of the engine gear housing. The radiator is 1 inch deeper and has a non-leaking filler cap and an improved overflow pipe. The regular equipment includes a Bosch high-tension dual ignition system, but make-and-break ignition is provided if desired. The magneto has been changed from the right to the left side. A feature of the new ignition system is the combined switch and coil, which passes through the dash, and is provided with a lock and key. One set of spark plugs is used over the inlet valves and improved supports are provided for the ignition cables. Instead of the forty-seven steel plates used in last year's clutch, there are now nineteen plates—ten steel ones and nine of bronze with cork inserts. Improvements are to be found in the rear axle in that the driving gear pinion may be adjusted within a range of .003 of an inch, and there are two additional ball thrust bearings to be found at the rear of the pinion gear. The spur gear differential mechanism heretofore employed is replaced by one of the bevel-gear-and-pinion design, and the rear axle casing has been reinforced by making the tubular portions from drawn steel tubing, which tapers toward the inner ends, at which it is flanged and hot riveted to the gear housing. Three-quarter scroll elliptic springs, which are 6 inches greater in length, replace the plain three-quarter elliptics of last year's models. The brake control rods are of simpler design and a cross shaft has been eliminated. The frame, which is ½ inch deeper, is of drop construction in front of the rear axle, and its side members have been widened toward the center. The Elliott type of front axle, in which the steering knuckle is held between the two ends of a yoke, is now used instead of the Lemoine type. Compression grease cups have been added on the spring shackle bolts of the rear ends of the front springs, and the front

ends of the rear springs; oil caps are fitted to the other ends of these springs; and the design of the spring clip plates is improved. The wheels on the four-cylinder models are now 36 by 4½ inches instead of 34 by 4, and on the six-cylinder models dimensions are now 36 by 4½ front instead of 36 by 4 front, the rear dimensions remaining the same. On all four-cylinder models the wheelbase has been changed from 120 to 126 inches, so that six-cylinder bodies are now applicable to the four-cylinder cars, and vice versa.

P. & S. Has Six-Cylinder Town Car

One of the novelties in the line of the Palmer & Singer Mfg. Co. is a 40-horsepower town car fitted with a limousine body and carrying a six-cylinder motor. Few changes are noted in the line. In model LXIV, six-60, the motor remains practically the same, with the exception of the addition of a larger flywheel, in which there is a fan and also housing for the multiple-disk clutch. A new rear axle has all the moving parts inclosed. In the gearbox the fourth speed is direct instead of the third. The wheelbase has been lengthened to 138 inches. A six-60 with a five-passenger body has a chassis practically identical with the other models, with the exception of the rear axle, which is slightly larger. The cylinders of the six are cast three en bloc instead of pairs. On the six-60 and four-50 models there is a new five-passenger body known as Milford, with convex sides and backs, giving a runabout position in the front seats and the comfort and luxury of a touring car body in the tonneau.

Packard's Minor Details

On the Packard 18 and 30 models the high-tension wires from the magneto distributor to the plugs are now encased in a metal tube which rises between the cylinder pairs and crosses to the side on which the spark plugs are located. The primary air intake pipe on the carbureter has been extended and now rises vertically to a point slightly higher than the top of the auxiliary air valve. An improvement on the rear springs is the addition of three short leaves in the base of the spring, which leaves are of greater radius than that of the leaves constituting the spring proper. With ordinary loads the spring proper carries the weight, but with extra loads the spring proper bears upon the three additional leaves, constituting the supplementary feature, so that there is the same resiliency of suspension with a light or heavy load. All touring cars are standard with fore-door bodies. In limousines the dome light is in the rear of the ceiling, thereby enabling the passengers to read with comfort.

Continuous Waterjacket in the Pullman

The Pullman Motor Car Co. is a pioneer in that it advocates the use of a continuous waterjacket for a four-cylinder motor. By the use of this continuous waterjacket construction there is a common water space from the rear to the front cylinders and the water piping is limited to the intake

and exhaust pipes. A water pump is used for maintaining the circulation, and in addition there is a belt-driven fan located between the front cylinder and the radiator. In casting these cylinders the Pullman company leaves large openings so gases can escape, and there is no danger of destroying the castings. In spite of the short space occupied by the motor, the design permits of the use of five crankshaft bearings. Little change has been made in the Pullman bodies, except to give a little more leg room by adding 2 inches to the wheelbase.

Rainier Has Been Refined

The efforts of the Rainier people for 1911 have been centered in refining their product and improvements are reported in the clutch, which now is operated by a toggle-joint construction, which method permits of the plates gaining a very large clearance, which does away with all drag; then, at the same time, permitting positive locking of the plates when the clutch is engaged. Models H7 and H4 are continued, but there has been a change in the fenders, running boards and running-board aprons. All electric wiring is concealed; the horn tube is carried inside the body of all models carrying fore-doors; the control levers on all models are carried inside the body; the steering post has been lengthened, and the angle changed, and the engine hood has been improved in its general appearance.

Regal Has Underslung Frame

The feature of the Regal line for the coming season is the roadster model M, which is mounted on a chassis having an underslung frame. The power plant consists of a 20-horsepower, four-cylinder motor, with its water-cooled L-type cylinders cast en bloc and mounted on a sub-frame consisting of two long tubular rails resting on cross frame members of special design. The crankshaft is mounted on two plain bearings, valves are adjustable and internal circulating oiling system is employed. Ignition is by means of a dual system, comprising a low-tension magneto with dry cells and an auxiliary coil located in front of the dash under the hood. The propellershaft is inclosed in torsion tube having a large ball joint bearing containing a universal joint at the front end and the gearset is a unit with the rear axle, which is a Weston-Mott construction. As for the changes in the regular line, model F of 1910 will be known as model Y in 1911. Model Y is a larger car similar to the model F of 1910, except that the gear-shifting rods are heavier. Heavier torsion rods are used, the rear axle is a slightly stronger construction, and there is a small change in the design of the rear axle casing. Brake rods are now inside of the side frame members, brake drums are considerably larger in diameter and a half-inch wider, and improvements are to be found in their general design and operation. The horns of the front side members extending out in front of the radia-

tor are longer, an I-beam front axle replaces the tubular construction previously used, and by lengthening the wheelbase from 108 to 110 inches the axle has been extended so that it is now a trifle in front of the radiator instead of directly below it. Wheels 33 by 4-inch have replaced those of 22 by 3½-inch dimensions. Visors are fitted to the fenders to improve their looks and prevent mud from being splashed on to the body of the car.

Reo Has Many Improvements

Timken roller bearings have replaced ball bearings in the front wheels, supporting the differential and carrying the propellershaft within the torsion tube. At the outer ends of the rear axle are Hyatt high-duty bearings. An accelerator has been added. Between the clutch and gearbox is a new coupling. By the removal of two bolts, the clutch can be removed without disturbing the gearbox, and vice versa. The flywheel has been made heavier and of greater thickness. By adding four more plates to the multiple-disk clutch, the number has been brought to twenty-four. Instead of one central clutch spring there are three regularly disposed around the flywheel face. One of the latest body types is a two-passenger torpedo using the standard chassis, except that it uses 32 by 3½ inch tires, instead of 34 by 3½ inch sizes.

Royal Has Novel Carbureter

A number of slight changes are to be found in the new Royal Tourist cars. The double ignition system, with a double set of plugs, is now replaced by a Bosch dual ignition system, having a new lockable combined coil and switch arranged on the dash so that just the face of the switch is visible when the hood of the motor is closed. Considerable change is to be found in the oiling system. The plunger pump, which was located at the right rear corner of the crankcase and driven by an eccentric and rod from the end of the camshaft, is now replaced by a gear pump situated on the right side of the motor near the rear, and driven by means of bevel gears from the camshaft. In the new oiling system, oil is forced through a filter located in the left rear leg of the motor and then up through sight feeds on the dash. Passing through the sight feeds, it is forced through three main leads to the three main bearings of the crankshaft on through the throws of the crankshaft to the connecting rod-bearings, up through the connecting rods to the wrist pin bearings through the hollow wrist pins, then through hollow wrist pins to the cylinder walls. The oil which overflows from the bearings passes into the splash compartments forming the upper section of the lower part of the crankcase, where a certain level is maintained. The cooling system is unchanged, except that a new leather-faced friction clutch drives the fan so that the fan can not be damaged in case its operation would be stopped by a bunch of waste that might be caught by

it. The carbureter is provided with a tubular by-pass communicating between the float chamber and the mixing chamber just above the butterfly valve, and when the throttle is closed a strong spray of almost pure fuel is sucked into the cylinders to prime them. This greatly facilitates starting. An important change, which greatly improves the riding qualities of the car, lies in the fact that the radius rods have a free bearing on the rear axle and are integral with the inside plates that support the brake shoes, so that all braking strains are transferred directly to the radius rods, and spring action is perfectly normal. A new construction is to be found in the steering knuckles in that the vertical shaft of the steering knuckle is held in a long roller bearing instead of a plain steel bushing.

Alden Sampson Has a Pleasure Car

The Alden Sampson Mfg. Co., of Detroit, Mich., which is well known as a maker of large commercial trucks, enters the field of 1911 with a pleasure car. It has a four-cylinder, en bloc, water-cooled motor, having a 4-inch bore and 4½-inch stroke, a constant level splash lubrication system, operated by a pump and having a sight feed on the dash, and a cooling system having a vertical-tube square-front radiator and a gear-driven centrifugal pump. The car has a full floating rear axle, two sets of internal expanding brakes on the rear wheels; wheels are 34 inches in diameter, and the wheelbase is 114 inches. Fore-door bodies are fitted to this car, which are built on the straight-line type.

Stoddard Has Many Changes

A thorough cleaning up of many little details has been accomplished in the Stoddard-Dayton cars in which the valve-in-the-head motor is used. The motor appearance is improved by enclosing within the tappet guides the springs that heretofore were outside of these rods. The water pipes are now metal instead of hose lengths. The fan has been provided with an eccentric adjustment. The size of the pump shaft has been doubled. A double ignition system is fitted, consisting of a Bosch magneto, and a secondary set with battery and combined timer distributor. The Bosch cylindrical coil is embedded in the toeboard, where the switch can be operated by foot. An improvement in the gearbox is the fitting of ball bearings for both shafts. Changing the front axle contour has lowered the body frame at this point. A plate has been fitted between the front springs and the spring seating, this plate preventing the latter from spreading. A ball and thrust bearing has been fitted in the steering gear; brake drums are increased in diameter and width; demountable rims are standard; shock absorbers are regular equipment; the brake rods are carried entirely inside the side members of the frame; and

(Continued on page 96.)

Simplicity in Little Things Makes

ON other pages of this issue Motor Age has tried to show the progress made in the matter of motor construction during the past year, as well as the progress made in the major parts of the car design, but on this and the following pages tries to bring out some of the minor improvements which are so important in the general operation of a car. Among these minor improvements the ignition appliances and wiring has come in for no small share of attention. In Fig. 1, part 1, the wires from the magneto are led directly to a rectangular insulating tube mounted on brackets attached to the cylinder castings, and there are holes in the sides of this tube through which the cables extend. Each hole is opposite a spark plug and with one cable coming out of each for its respective plug there is no possibility of the motorist getting the cable from No. 1 cylinder onto the spark plug of No. 2 cylinder, and vice versa.

In Fig. 1, part 2, another method of protecting and distributing the ignition cables is shown and there is a marked similarity between this arrangement and that of the motor just described. A dual ignition system is employed in the latter case, so that just one set of plugs and ignition cables is required, whereas in the first illustration two sets of plugs and cables are used, and even so, all wires are conveniently carried in the single insulating tube. A popular method of protecting the wires of some cars was shown in Fig 1, part 3. The rear end of the new combined Bosch dual ignition coil and switch can be seen protruding through the front of the dash, with its high and low-tension cables, one set for the battery and the other set for the magneto being carried in two small tubes, and the high-tension cables from the distributor of the magneto being supported in a large tube. All three tubes are neatly carried alongside the motor cylinders on the same bracket and the wires are well protected from the heat of the engine. In Fig. 1, part 4, with the magneto arranged so that the distributor is near the space between the two cylinder castings, the wires are externally but neatly arranged on a vertical post and brackets, arranged between the two cylinder castings. Fig. 4, part 1, shows a rectangular insulating tube clamped onto and above the return water manifold. This carries the high-tension ignition cables for six-cylinders, each having two sets of plugs. The holes in the insulating tube are bushed to prevent fraying of the insulation, and they are very systematically arranged so that errors in connecting up the wires are reduced to a minimum. The cables from the magneto to the end of the tube are neatly bound together.

A most simple arrangement of the ignition cables is illustrated in Fig. 4, part 2. This motor employs a dual ignition system, and instead of having the cables pass through holes in the insulating tube they are permanently connected to terminals which pass through the tube. Short connections with simple insulated terminals are used between these terminals and the spark plugs, which may be removed at will and with perfect safety while the motor is in operation or otherwise. In Fig. 4, part 3, an ingenious way of carrying the ignition battery is shown. A metal box is sus-

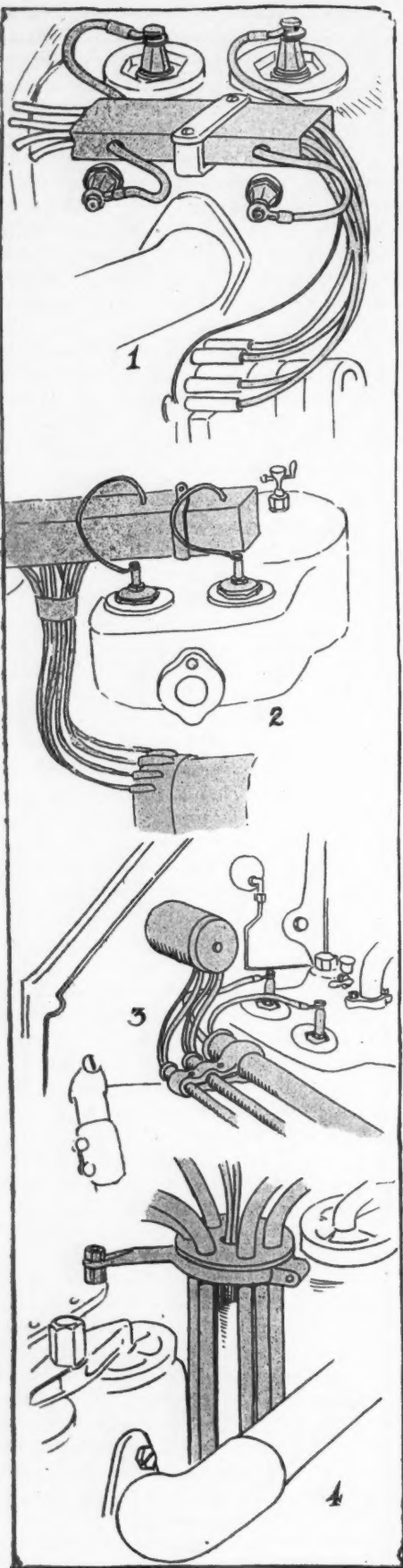


FIG. 1

1—COLUMBIA'S IGNITION WIRES

2—LOCOMOBILE'S IGNITION CABLES

3—ALCO'S WIRE PROTECTION

4—WIRE SUPPORT ON PREMIER

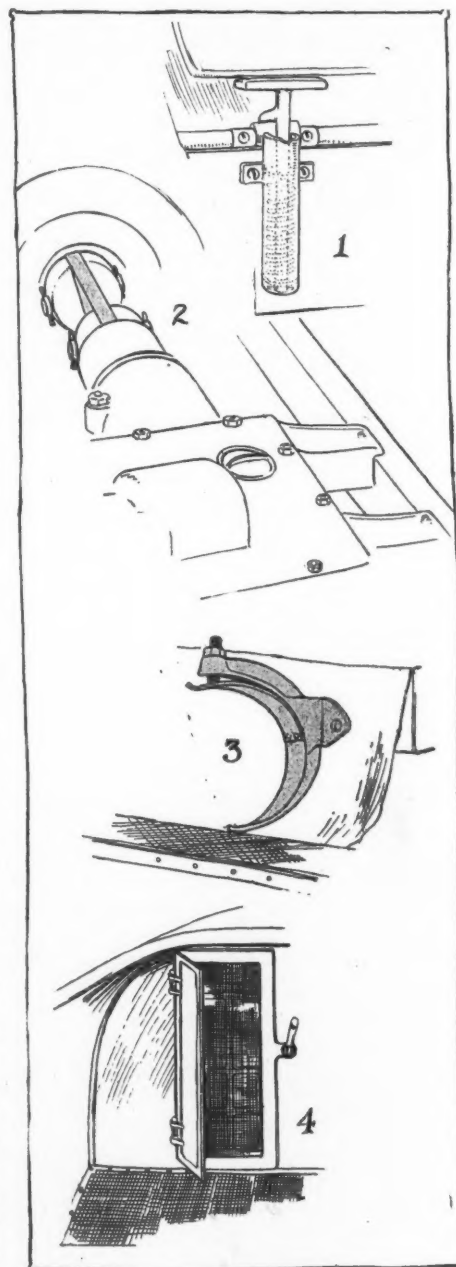


FIG. 2

1—IMPROVED FRANKLIN HOOD-CLAMP

2—REO CLUTCH AND GEARSET JOINT

3—CHALMERS' GAS TANK CLAMP

4—FRANKLIN DASH VENTILATOR

Motoring Easy for Owners of Cars

pended from two cross bars under the tonneau board of the car, and by removing one of the floor boards, as indicated in sketch, access to the batteries is obtainable.

Much trouble has been experienced in the past through short circuits that have occurred, due to the terminals of the ignition devices becoming wet from rain, from water splashed upon them on the road, or when the car is being washed. To eliminate troubles from this source one make of car has a rubber sleeve inclosing the wires and coil terminals, as indicated by the dotted lines, Fig 4, part 4. The sleeve passes over the end of the coil,

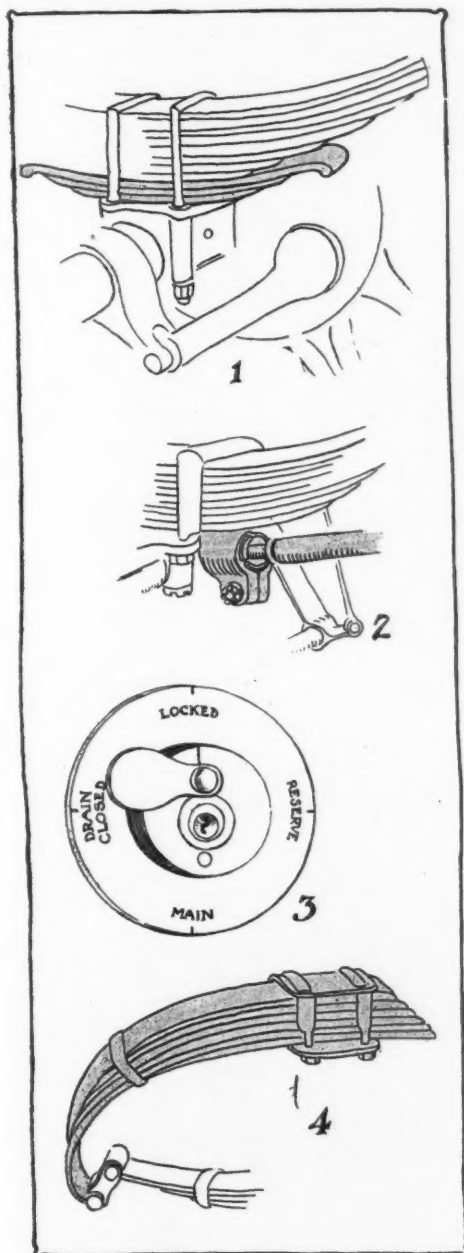


FIG. 3

- 1—PACKARD'S AUXILIARY SPRING LEAVES
- 2—WINTON'S RADIUS ROD JOINT
- 3—FRANKLIN GASOLINE SUPPLY CONTROL
- 4—STODDARD-DAYTON'S SPRING DESIGN

which protrudes over the dash and is connected to the adjacent end of the insulating tube, which is arranged above the motor cylinders.

Many other little devices of an ingenious nature are to be found in other parts of various motor cars. In Fig. 2, part 1, a hood clamp is shown whose operation is most simple, being required to merely turn the handle and a little lever or finger that holds the hood slips off and around into a notch on the top of a tubular bracket that carries the spring of the clamp.

In order to move the clutch of some cars it is first necessary to move the transmission case and sometimes the rear axle. In the Reo car this is overcome by simply arranging a plate between the slotted ends of the clutch and gearset shafts, and by removing two cotter keys and two pins which secure the plate in place, it may be removed and the clutch disassembled from the motor in a few minutes without disturbing the gearset. At Fig. 2, part 3, one of the clamps for holding the acetylene gas tank on the Chalmers cars is shown. To change tanks with this sort of device it is only necessary to loosen the lock nut and the stud which compresses a blade spring carried on the side of the bracket.

To overcome the heat often present in front of the seats of a fore-door body several cars this year are provided with ventilators in the dash. One of these is shown in Fig. 2, part 4. There is a large opening in the dash on either side covered by a fine mesh screen to keep out the dust, and a spring-hinged door is fitted, which may be closed and latched in cold weather.

In Fig. 3, part 1, a means of prolonging the life of vehicle springs and of reinforcing a spring without interfering with its easy riding qualities is illustrated. It consists of three short, heavy spring leaves arranged below the leaves of the ordinary spring, which are not brought into action except when the regular springs are overloaded.

An excellent feature of some cars this year is to be found in the way of an adjustable ball-and-socket joint at the rear ends of the radius rods. Another worthy feature to be seen this year is a device conveniently provided at the side of the body, under the driver's seat, by means of which the gasoline supply may be shut off and locked, the gas tank drained or the reserve supply brought into use, without the necessity of the driver having to crawl under the car, or lift the footboards. It consists of a knurled knob, such as shown in Fig. 3, part 3, containing a lock, and an indicator mark on the knob which is designed to register with similar marks on the dial, which is attached to the body.

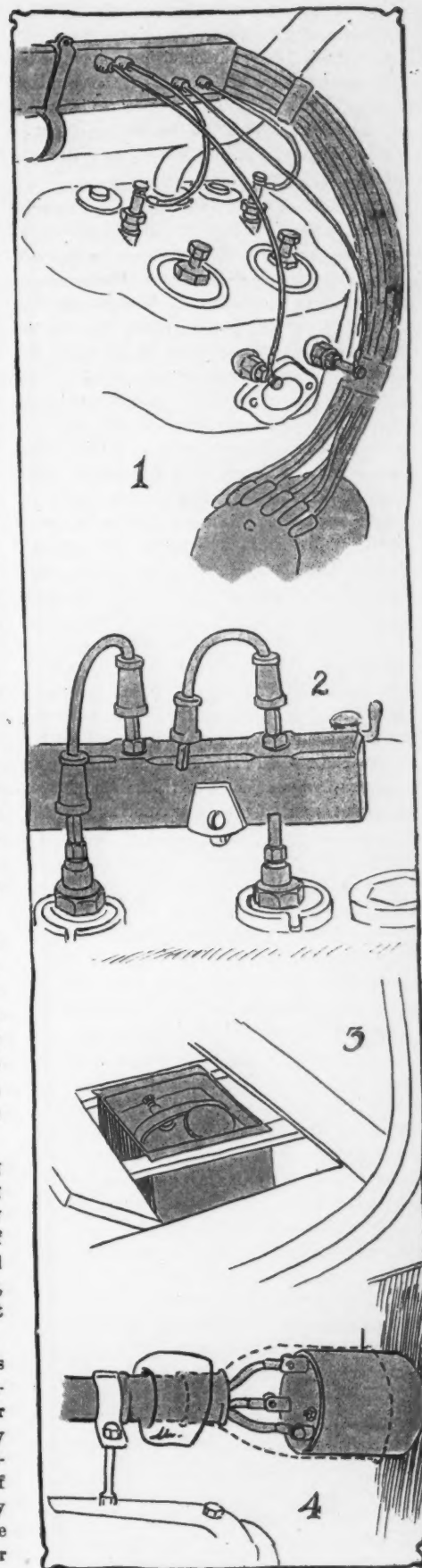


FIG. 4

- 1—PIERCE-ARROW WIRE ARRANGEMENT
- 2—CHALMERS' IGNITION WIRE FEATURE
- 3—CHALMERS BATTERY UNDER TONNEAU
- 4—HUDSON COIL HAS RUBBER SLEEVE

As an innovation in spring design, Fig. 4, part 4, shows the stub ends of the upper portion of the three-quarter elliptic springs being extended out in front of the bracket, so that each spring plate end has the benefit of the leverage obtained by having its stub end resting upon that of the leaf directly below it.

The matter of lubrication is a paramount one and the attention the different manufacturers have given it is shown in the two score sketches on these pages. One example of the accessible grease cup is shown in Fig. 5, part 8, which is the grease cup on the Chalmers 30 and 40, used to lubricate the universal joint in rear of the clutch. This grease cup is located on the floor board of the car between the driver's feet, where it is the easiest matter to give it a turn when necessary. A flexible tube connection leads from this cup to the part requiring lubricant.

The methods of lubricating the universal joints and other parts under the chassis, without the driver having to crawl under the car, are illustrated in Fig. 6, at parts 3 and 5. Part 3 shows circular openings cut away in the mud apron between the frame and running board of the Lozier. In each opening is the end of a grease cup which has a flexible tube leading to a universal joint or some other part under the center of the chassis. Part 5 in this illustration shows an oval-shaped door in the shield over the front end of the rear spring on the Hudson car. This door has a spring hinge which holds it shut without any fastening, and it has to be held open as illustrated. The door offers a very ready means of lubricating the yoke ends on the brake rods where they hinge to the levers on the ends of the equalizers. One grease cup can also be reached through this opening but which cup is not shown in the illustration.

Grease cups invariably get lost. A few years ago more than twice as many were lost as now, the improvements being due largely to the penalization imposed for lost grease cups in reliability contests. The Speedwell company has a new design which is claimed to be proof against coming off and is illustrated in Fig. 6, part 7. This illustration shows the rear shackle of a front spring, each shackle bolt carrying a grease cup. The cover of the upper grease cup is removed and the inside of the cup is shown at the right. It carries a T-shaped stem in the center, the arms of the T fitting in two opposing slots in the end of the bolt which forms the grease cup. The T piece is carried on a washer inside the cup, this washer being a fairly tight fit, but not too tight to allow its not rotating when the grease cup is being threaded on. The friction between the washer and the cover of the grease cup, and the threads, are looked upon to hold the cover in place.

The prolific fitting of grease cups is shown in many of these illustrations. Fig. 5, part 1, shows two on the Cadillac steering mechanism; Fig. 3 shows that good practice of putting the grease cup on the inner end of the front spring bolt where it is less liable

Refinements that Save Time and Worry

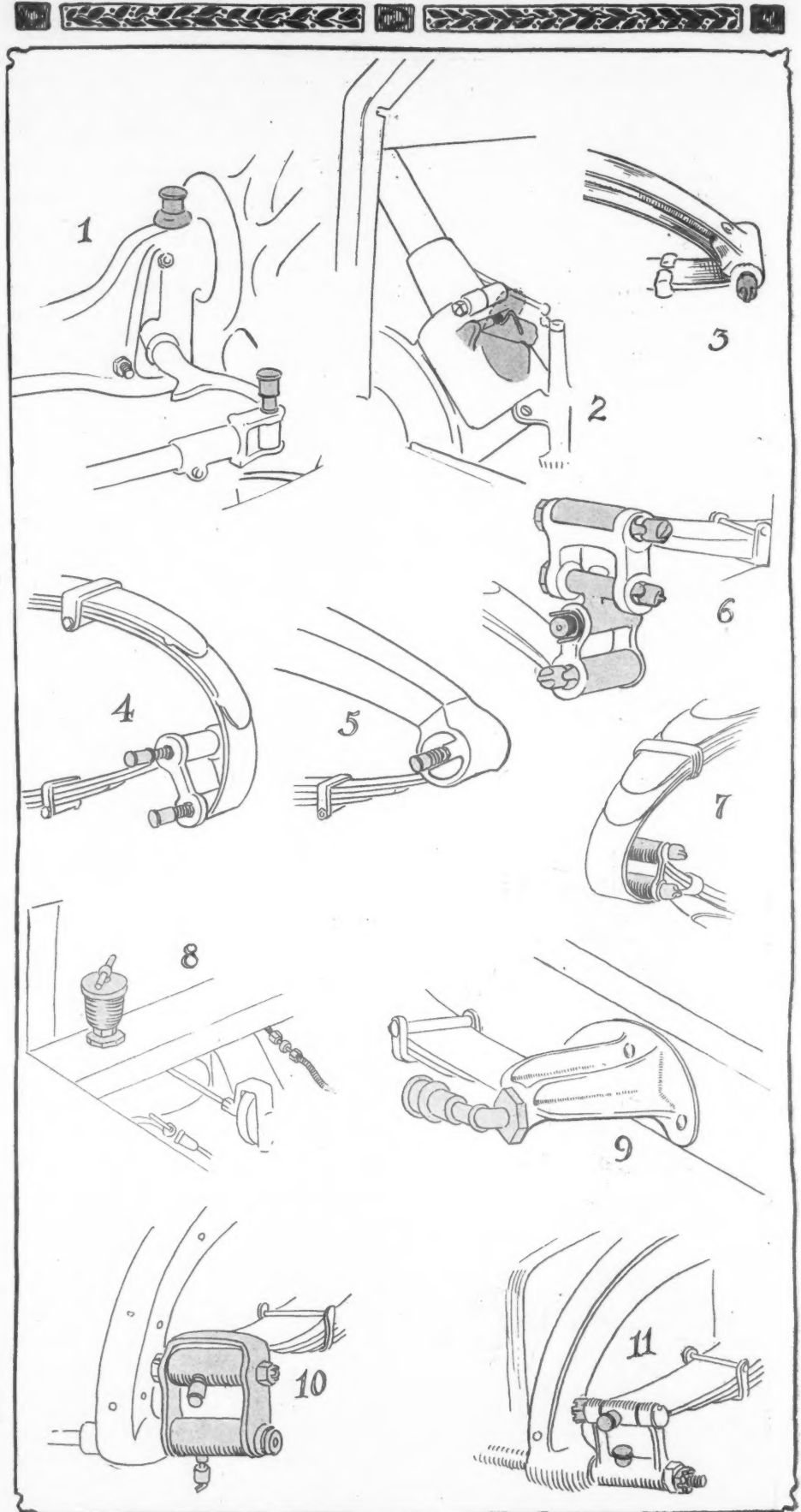


FIG. 5—1, CADILLAC STEERING KNUCKLE; 2, PREMIER STEERING-GEAR OIL-CUP; 3, INSIDE SPRING-BOLT GREASE CUP; 4, 5, HAYNES SPRING SHACKLE GREASE CUPS; 6, LOZIER UNIVERSAL SPRING SHACKLE; 7, SPRING SHACKLE GREASE CUPS; 8, CHALMERS' CLUTCH-OILING CUP; 9, CADILLAC REAR SPRING-BOLT OILER; 10, LOCOMOBILE SPRING SHACKLE; 11, OIL-CUPS ON SPRING SHACKLE

Things that Make Motoring Enjoyable

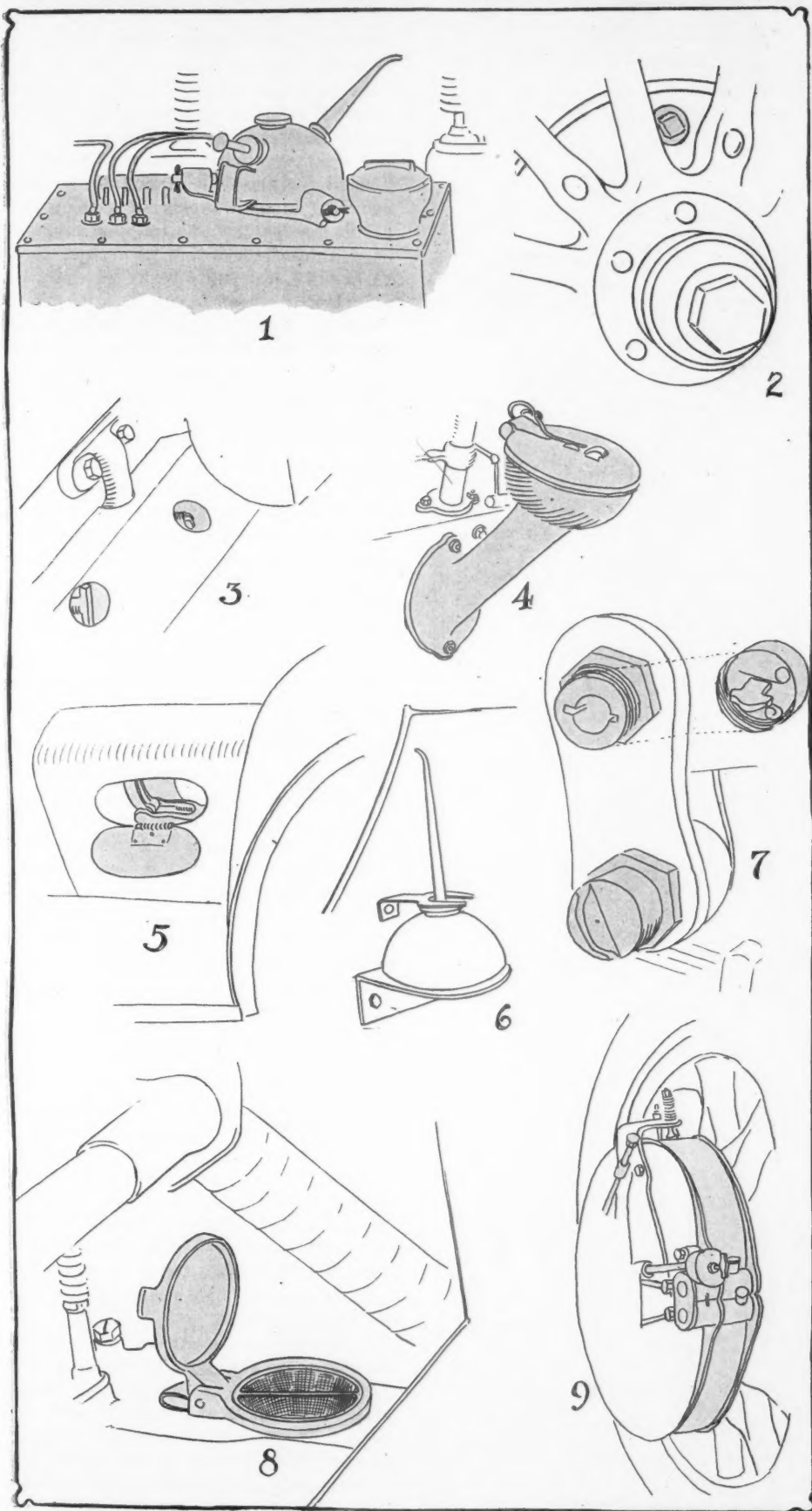


FIG. 6—1, THOMAS OILING FACILITIES; 2, TO OIL CADILLAC BRAKE MECHANISMS; 3, TO GET AT LOZIER'S SPRING BOLT OILER; 4, LARGE FILLER CAP ON NATIONAL MOTOR; 5, GET-AT-ABLE HUDSON REAR SPRING SHACKLE; 6, PRIMING OR OIL CAN ON FRANKLIN MOTOR; 7, SPEEDWELL INTEGRAL SHACKLE BOLT GREASE CUPS; 8, PREMIER'S MOTOR OIL FILLER CUP; 9, FEATURES OF PACKARD BRAKE AND BEARING OILING

to be injured. Fig. 5 shows the same construction on the Haynes car, and part 4 shows a similar precaution on a rear spring. In part 6 is shown the policy of fitting four on the corner shackle of the platform construction of the Lozier cars. Each grease cup cover is held in place by a pair of clamps as illustrated. In part 9 is a Cadillac contrivance to render a grease cup accessible. It is on the front end of a rear spring where the fender covers the spring. The grease cup stem is elongated and carried rearward so that it can be reached back of the fender.

In Fig. 6, part 9, are illustrated two lubrication accessibilities in conjunction with the brakes of the Packard car. At the near side of the drum is shown the large grease cup with its long horizontal stem leading to the bearing at the axle and at the top center of the drum is a smaller grease cup with long stem, which leads diagonally down to the expanding cam for the internal brake. By bringing both of these grease cups to the outside of the drum, as illustrated, it is possible to lubricate these parts without having to get down on your knees or grease the sleeve of your coat.

The trend towards facilitating lubrication is not entirely confined to the grease cups but evidences itself in the enlarged filler caps used for replenishing the oil in the crankcase. Two examples of this are shown in Fig. 6, one, part 4, is the large filler pipe on the side of the National motor, and the other, part 8, shows the hinged filler cap on the rear arm of the Premier motor. The filler cap on the National is hinged and held down by a spring. It has to be held open while refilling, but the spring holds the cover in place at all other times. In this filler cap, as well as in that on the Premier, conical wire screens are fitted, this precaution being taken to avoid grit or other undesirable particles getting into the crankcase. The quest for an accessible grease cup or oil filler has been carried still further by the Premier company, as shown in Fig. 5, part 2. Instead of the ordinary grease cup on the steering gear, there is a hopper-like expansion which is fitted with a hinged cover, there being a spring in conjunction with the hinge to hold the cover closed.

In Fig. 6, part 2, is shown an accessible Cadillac scheme for oiling the brake mechanism. It is merely a large plug which threads into the drum. With the plug removed an oil can can be used. In Fig. 6, part 6, a simple Franklin device for holding a small gasoline or oil can is shown. The Y-shaped clip fitting around the spout of the can presses downwards with sufficient force to hold the can at all times.

Two important tendencies the present year are illustrated in Fig. 7, one of which appears in part 8 of this illustration and is the new power pump fitted on the left front of the Pierce-Arrow motors and used for inflating the tires. This pump is now manufactured entirely by the Pierce company and the piston and cylinders are

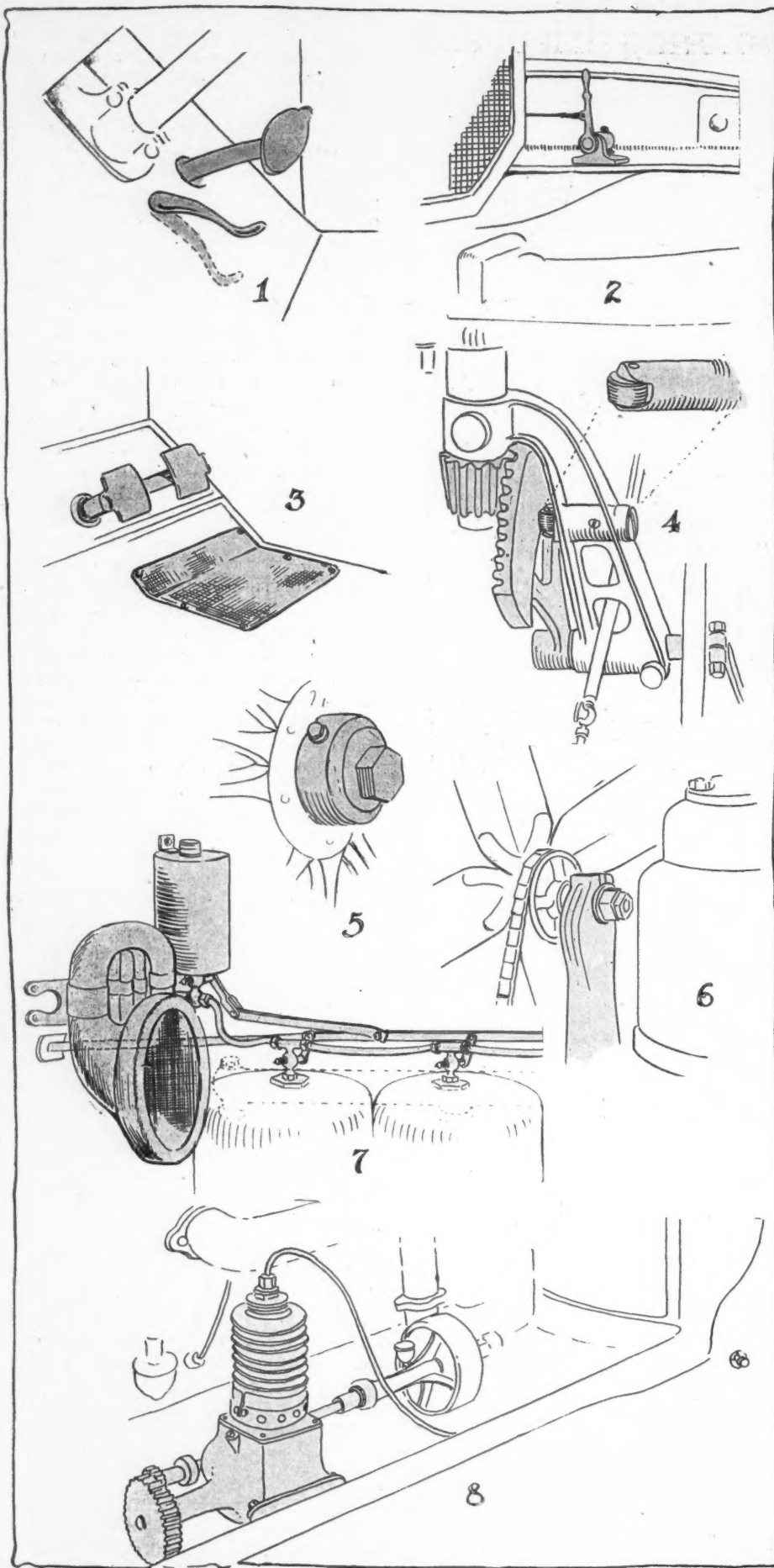


FIG. 7-1, PREMIER FOOT ACCELERATOR; 2, CARBURETOR CHOKER ON SPEEDWELL; 3, HEEL-PLATE ON COBBIN; 4, THRUST ROLLER REO STEERING GEAR; 5, TO LOCK NATIONAL WHEEL HUB-CAPS; 6, CADILLAC ADJUSTABLE FAN SUPPORT; 7, ELMORE'S HORN AND CYLINDER PRIMING-TANK ON DASH; 8, PIERCE-ARROW TIRE PUMP

as carefully ground and as accurately made as the big cylinders of the car. The pump is driven from the motor through a sliding pinion on the water-pump shaft, which pinion is meshed with a large gear on the air-pump shaft. The pump is air cooled and has a regular splash lubrication system.

In this same illustration, part 7, are shown two Elmore novelties, one the horn, which is located on the forward side of the dash beneath the hood, and the other a small gasoline tank carried on the dash and containing a supply of gasoline for priming purposes. The priming cups are located in the cylinder heads and their valve arms are connected by a horizontal rod which extends through the dash where it takes a handle the driver can operate. This rod also has lever connection with the valve and the gasoline tank, so that when the motor has to be primed all that is necessary to do is to pull the lever on the dash, which simultaneously opens the petcocks and turns on the gasoline. The Pierce-Arrow models are regularly fitted with the priming device, which consist of a plunger pump on the dash, which draws gasoline from the gasoline gauge and forces it through a four-point nozzle into the intake manifold.

The question of brake adjustment is always a live topic. You can adjust some brakes without taking your gloves off, whereas to adjust others calls for a suit of overalls and a repair kit so that you can get under the car. The three examples illustrated in Fig. 8 are conspicuous by their ease of adjustment. The first example is the Alco, part 1, which shows the forward end of the brake rods located at the front end of the rear spring. The forward end of each rod is threaded and takes a self-locking wing nut. This nut by a cone tip locks twice in each rotation in a V-slot in the short lever arm on the brake cross rod. The wing nuts are easy to operate and give positive adjustment. In part 8 is shown a similar method of adjusting the external brakes on the Winton. The rear part of the brake drum is illustrated, as is the self-locking wing nut. This wing nut is on a short rod hinged at its lower end on the brake-operating shaft and with its upper end passing through a bracket on the brake band. In part 4 is shown only the reverse, practically a duplicate system of adjusting the external brake on the Packard car.

The Reo uses a novel steering gear, as illustrated in Fig. 7, part 4, which differs from all other types in that both the gear and sector are exposed. The two are held in adjustment by a plunger and roller which bears upon the rear face of the sector. This plunger is pressed against the sector by a coil spring and the tension of this spring can be altered with a screw-driver. A set screw is used to retain the adjustment. A novel means of preventing the loss of a hub cap is illustrated in Fig. 7, part 5, in which the National company

threads the hub cap on and uses an ordinary hex-headed setscrew to hold it in place.

The question of clutch brakes is as omnipresent this year as ever before; in fact, it has gained in popularity. Fig. 8 illustrates three types: In part 2 is the Cadillac, in which a leaf spring with a friction plate on its end is held against a disk on the clutchshaft. An angular rod passes through the spring leaf and takes a coil spring, which assists in holding the brake in position and also affords a means of adjustment. On the Overland, part 6, three clutch springs, regularly spaced around the clutch circumference, are used instead of one central spring, and spinning of the clutch is taken care of by a small plunger with a mushroom head. The plunger is backed up by a spring. On the Speedwell, part 7, the clutch brake is a curved arm secured to the cross-shaft and with a mushroom face to bear upon the clutch. As the clutch pedal is depressed this brake is carried forward and meets the cone part of the clutch, which is brought backwards at the same time.

The safety precautions in a car should invariably be looked after; an ounce of prevention is better than a pound of cure. Radius rods are generally weakest at their forward end, and they have broken here on many makes of cars in the past, and this end of the rod dropping and striking the ground has, on one or two occasions, caused an accident. On the Alco this is guarded against by a hook, Fig 8, part 3, which is made specially large and which would catch the end of the rod should it break.

In order to facilitate starting the Speedwell company has fitted on the right frame member in front of the radiator a short lever which connects with the starting valve of the carburetor in order to choke the primary air. To close the valve this lever is carried through 90 degrees rotation to the front, at which position it locks so that the driver can give his entire attention to cranking instead of having to hold the valve with one hand.

On the Corbin car a small corrugated heel plate is fitted on the floor board, Fig. 7, part 3, to prevent the heels slipping and consequently losing. It very frequently happens that in the accelerator control of the carburetor that with the pedal the foot remains in a cramped position all day. It is also a fact that going over rough roads the foot is constantly vibrating, and so the amount of mixture varies. This is not well for the motor. Part 1, Fig. 7, illustrates the Premier throttle, which has a sidewise movement, the dotted position shows the open throttle position of the pedal.

A novel and yet simple fan belt adjustment is used on the Cadillac. The fan support has a vertical slot in its upper end to receive the shaft of the fan. A locking nut and spring washer hold the shaft in nut and spring washer secure the shaft.

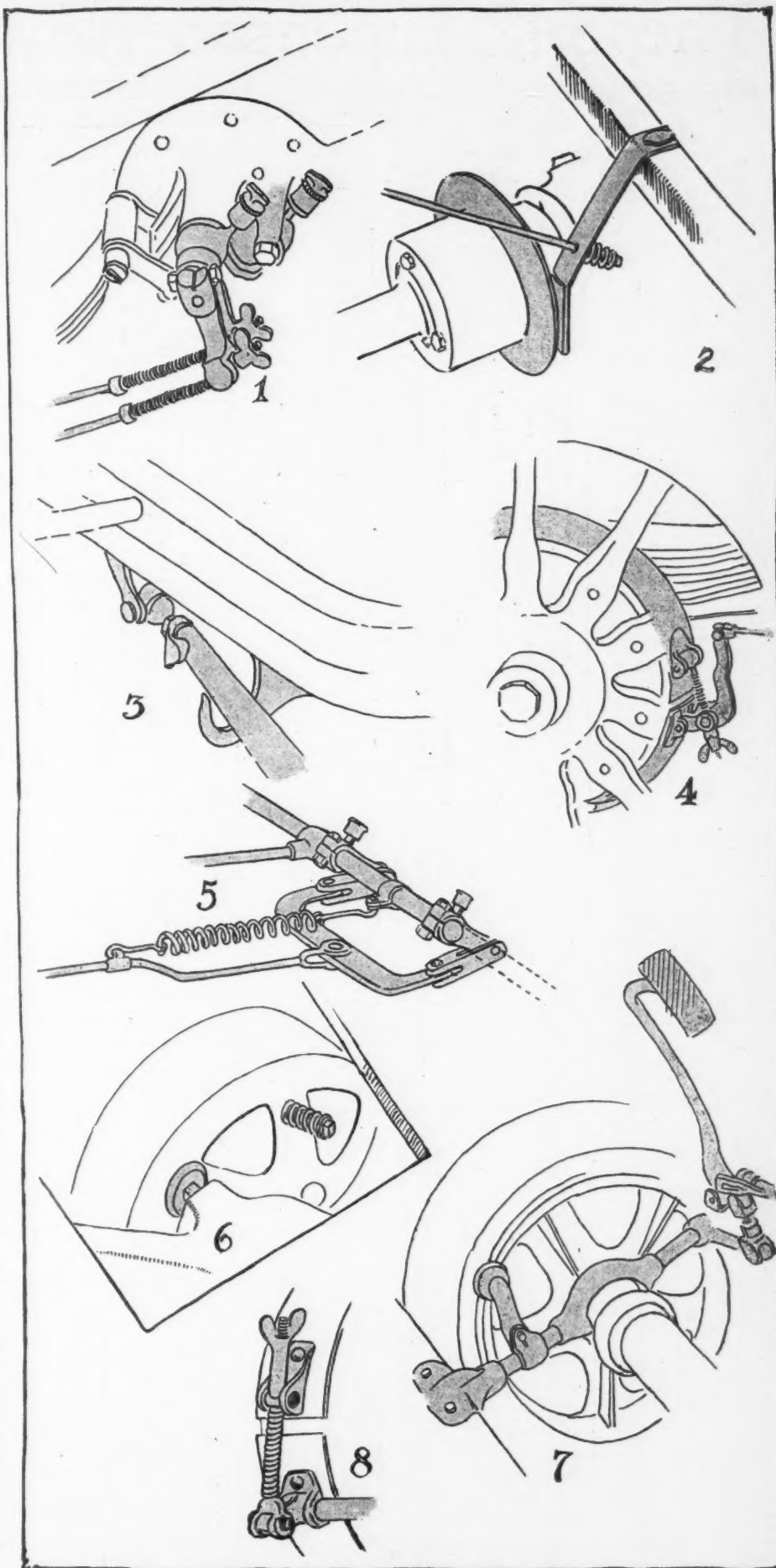
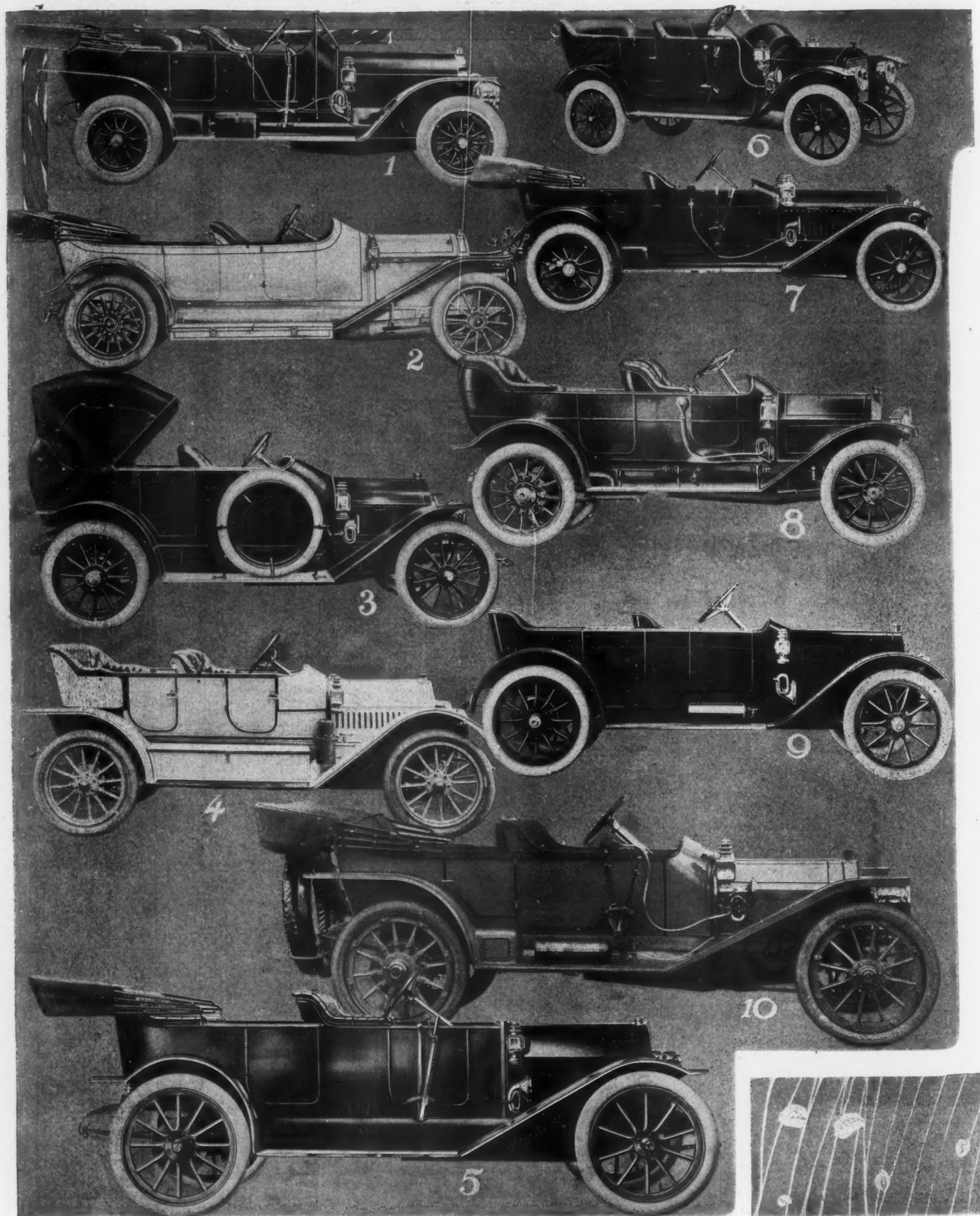


FIG. 8—1, ALCO BRAKE ADJUSTMENT AND OILING; 2, CADILLAC CLUTCH BRAKE; 3, ALCO'S RADIUS ROD AND PROTECTOR; 4, CONVENIENT BRAKE ADJUSTMENT; 5, REO BRAKE EQUALIZERS; 6, OVERLAND CLUTCH BRAKE; 7, SPEEDWELL CLUTCH BRAKE; 8, WINTON BRAKE-BAND ADJUSTMENT

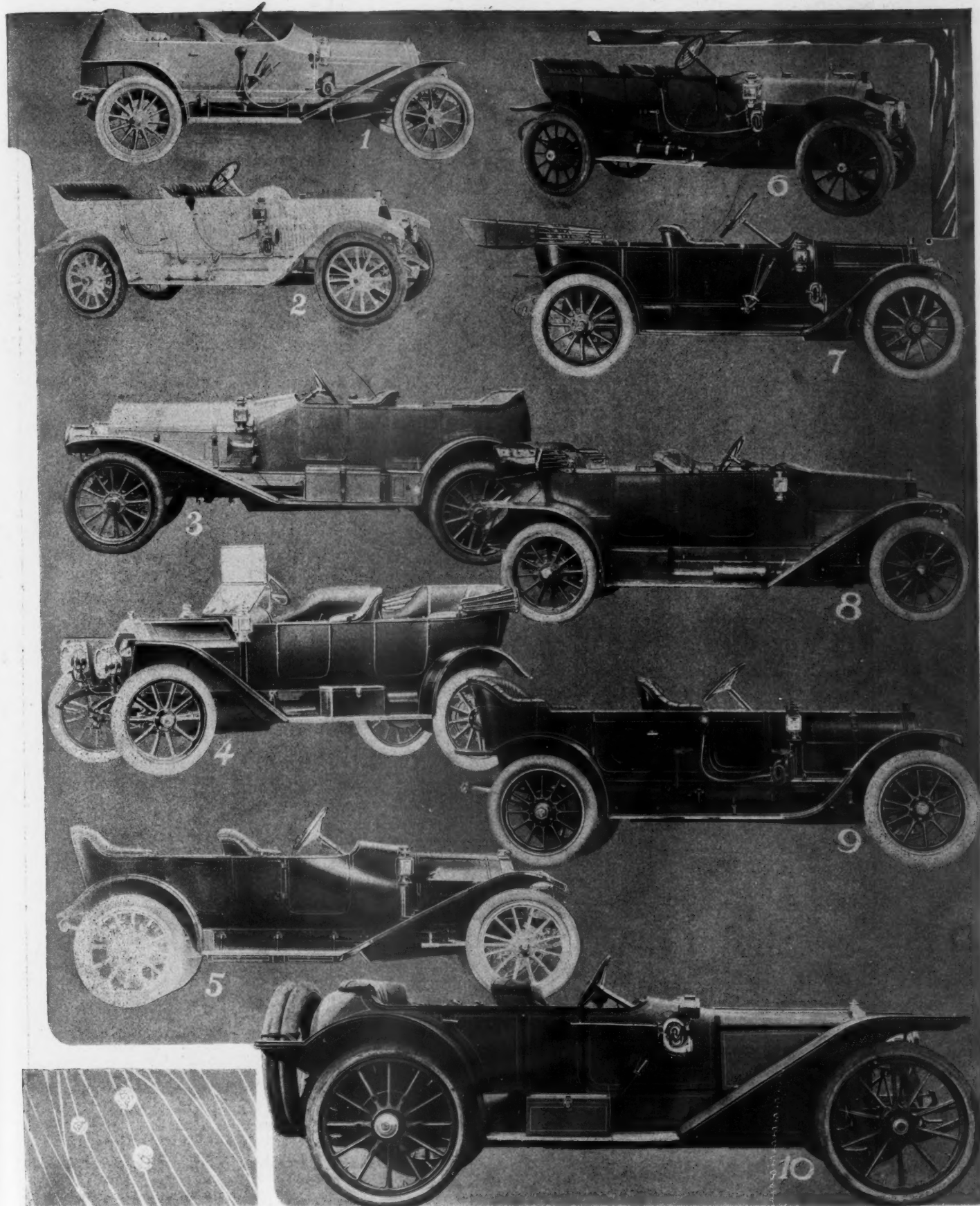
Fashion Dictates Varied Designs of Torpedoes



The New Torpedo Styles Show Every Variety

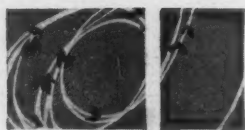
1—Knox Seven-Passenger Car; 2—Stoddard-Dayton 50 for 1911; 3—Moon Five-Passenger Car; 4—Jackson Five-Passenger Car; 5—Alden Sampson Five-Passenger Car; 6—White Five-Passenger Car; 7—Peerless Six-Cylinder Car; 8—Cadillac Five-Passenger Car; 9—Chalmers Five-Passenger Car; 10—Locomobile Five-Passenger Car

Combining Personal Comforts and Body Style

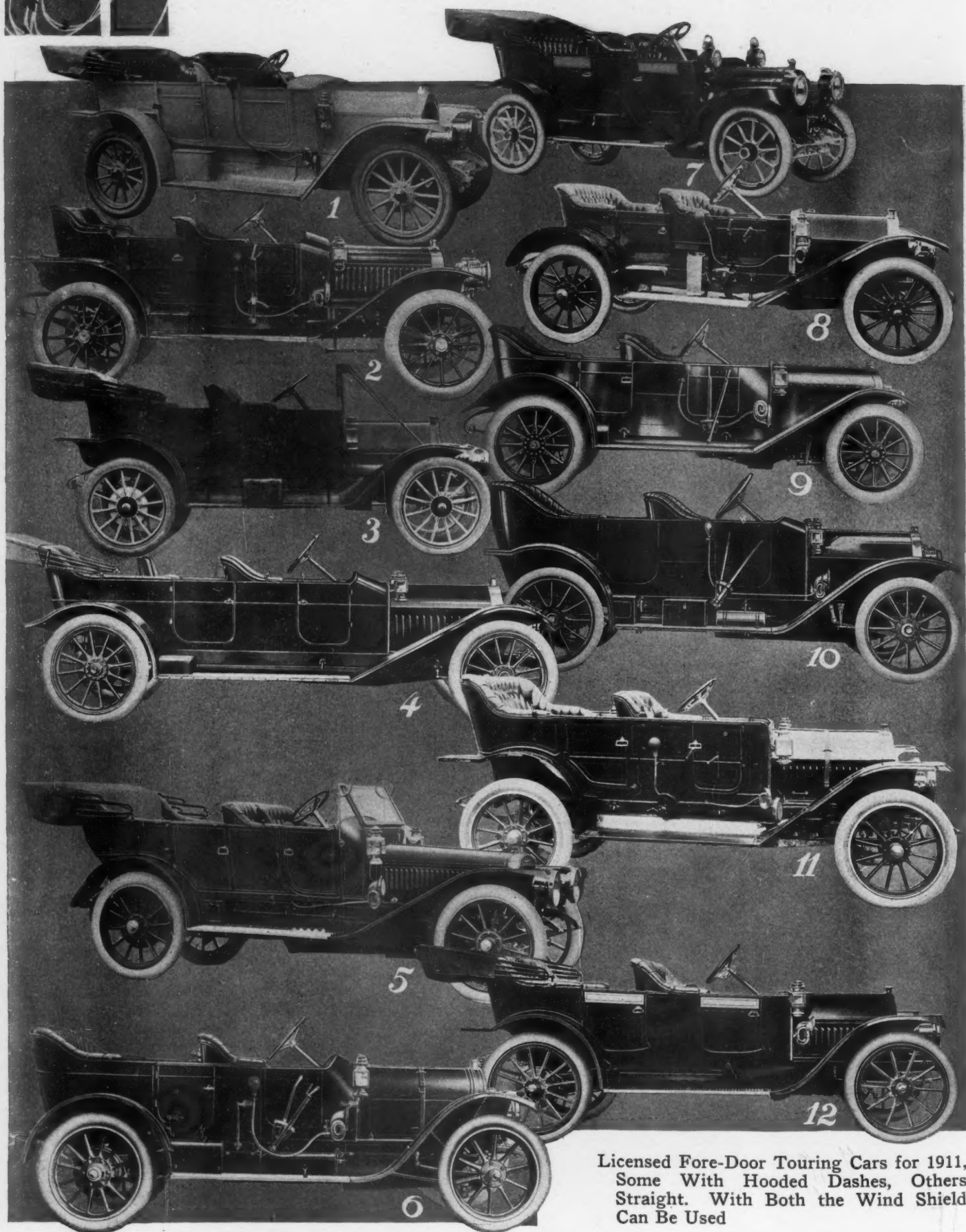


Torpedo Types With the Heavily-Hooded Dash

1—Palmer-Singer Five-Passenger Car; 2—Thomas Six-Cylinder Torpedo; 3—Chadwick Torpedo; 4—Ohio Torpedo; 5—Overland Torpedo; 6—Thomas Five-Passenger Car; 7—Hudson Five-Passenger Car; 8—Speedwell Five-Passenger Car; 9—Pope-Hartford Five-Passenger Car; 10—American Traveler Five-Passenger Car



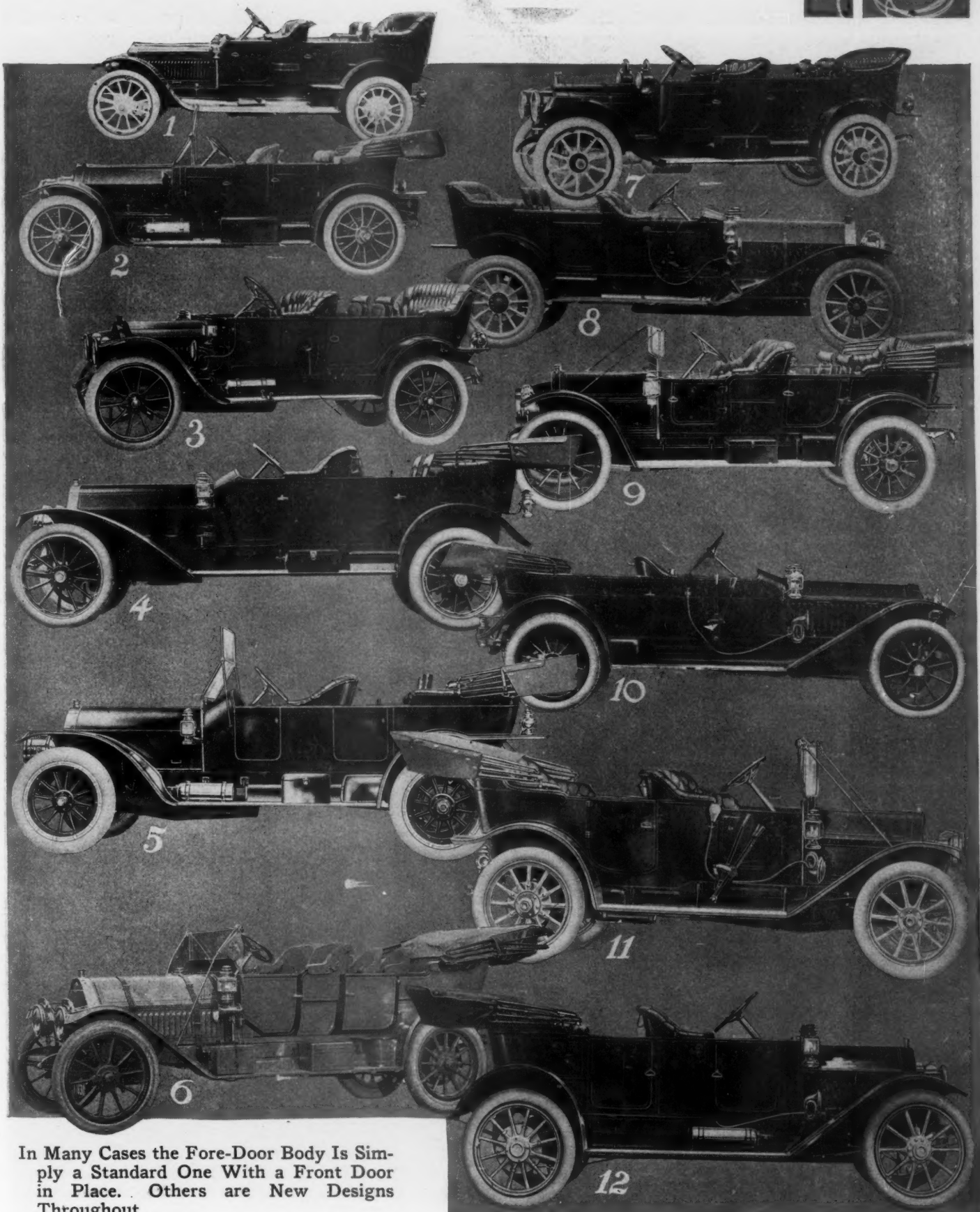
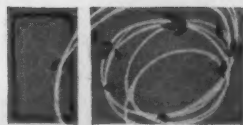
Makers, Big and Little, Have United In



Licensed Fore-Door Touring Cars for 1911,
Some With Hooded Dashes, Others
Straight. With Both the Wind Shield
Can Be Used

1—Pullman Five-Passenger Car; 2—Maxwell Five-Passenger Car; 3—Reo Five-Passenger Car; 4—Atlas Seven-Passenger Car; 5—Winton Five-Passenger Car; 6—Pope-Hartford Five-Passenger Car; 7—Packard Five-Passenger Car; 8—Midland Five-Passenger Car; 9—Corbin Five-Passenger Car; 10—McIntyre Five-Passenger Car; 11—Jackson Five-Passenger Car; 12—Everitt Five-Passenger Car

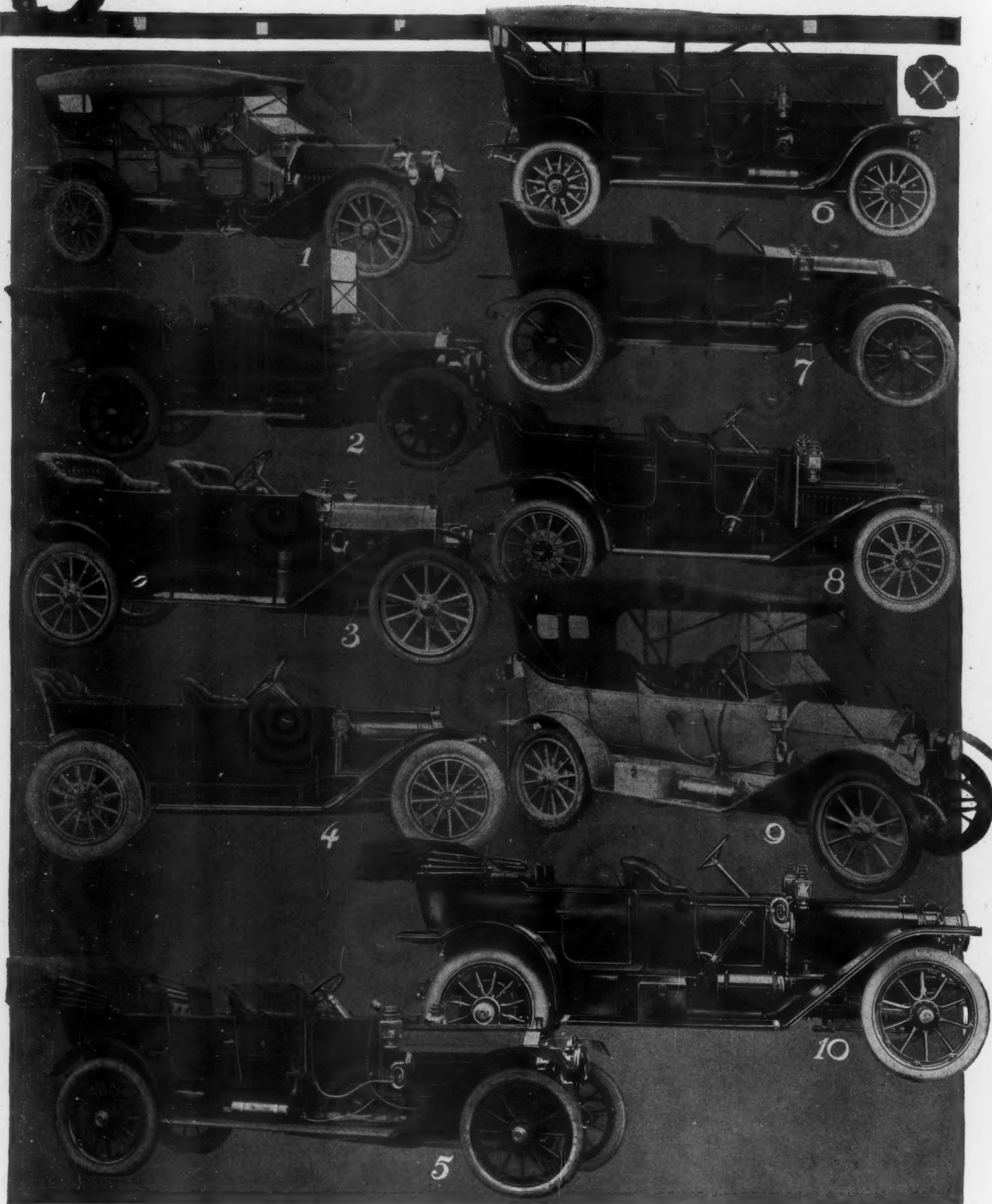
Developing the Stylish Fore-Door Effect



In Many Cases the Fore-Door Body Is Simply a Standard One With a Front Door in Place. Others are New Designs Throughout

1—Lozier Seven-Passenger Car; 2—Kissel Seven-Passenger Car; 3—White Seven-Passenger Car; 4—Stevens-Duryea Seven-Passenger Car; 5—Knox Seven-Passenger Car; 6—Thomas Seven-Passenger Car; 7—Packard Seven-Passenger Car; 8—Premier Seven-Passenger Car; 9—Stearns Seven-Passenger Car; 10—Peerless Five-Passenger Car; 11—Cadillac Five-Passenger Car; 12—Marmon Five-Passenger Car

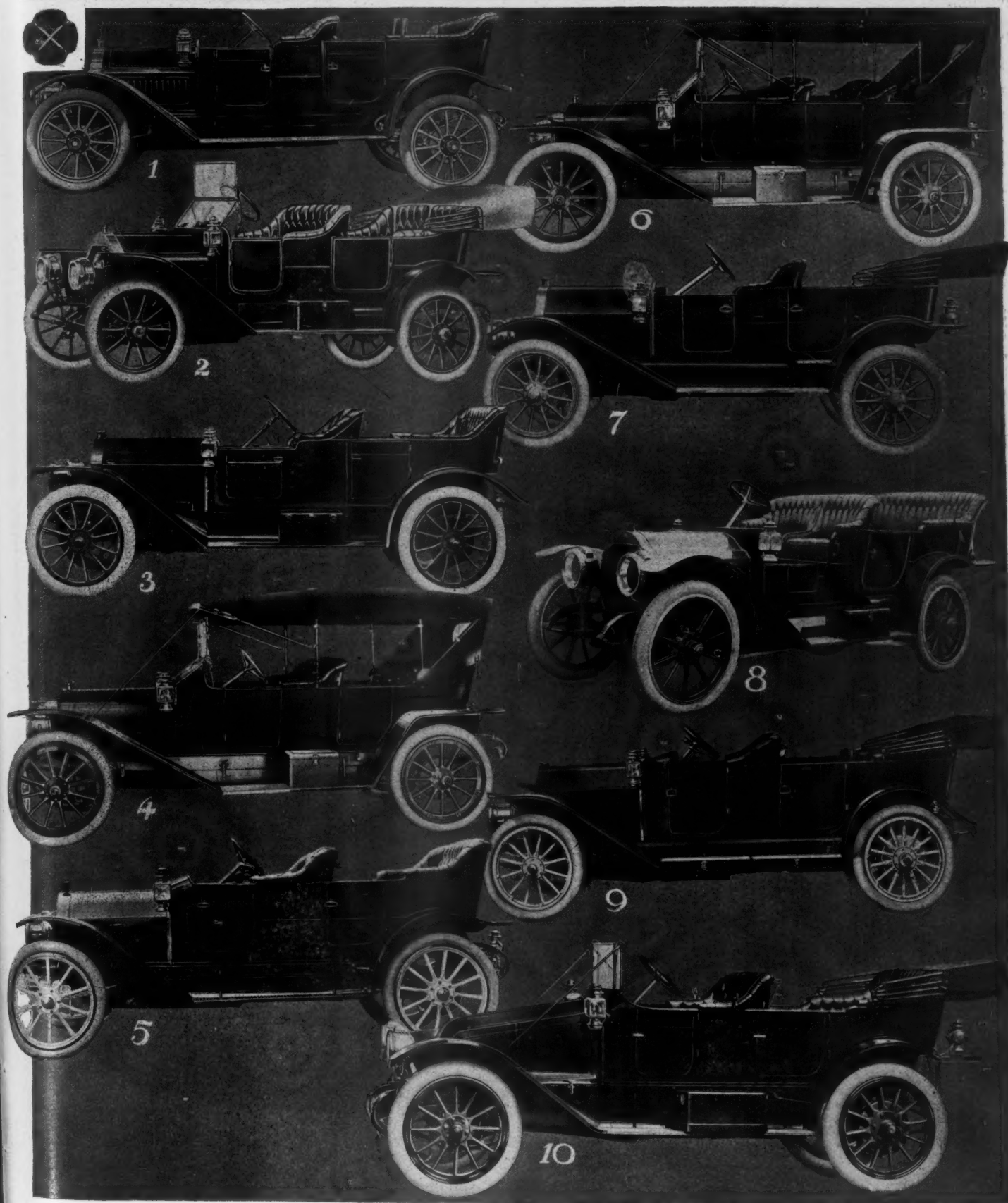
The Fore-Door Body—A Creation of Last Year



Five and Seven-Passenger Fore-Door Touring Cars

1—Amplex Five-Passenger Car; 2—Rainier Seven-Passenger Car; 3—Moon Five-Passenger Car; 4—Overland Five-Passenger Car; 5—Locomotive Seven-Passenger Car; 6—Alco Seven-Passenger Car; 7—Elmore Five-Passenger Car; 8—Regal Five-Passenger Car; 9—Case Five-Passenger Car; 10—American Seven-Passenger Car

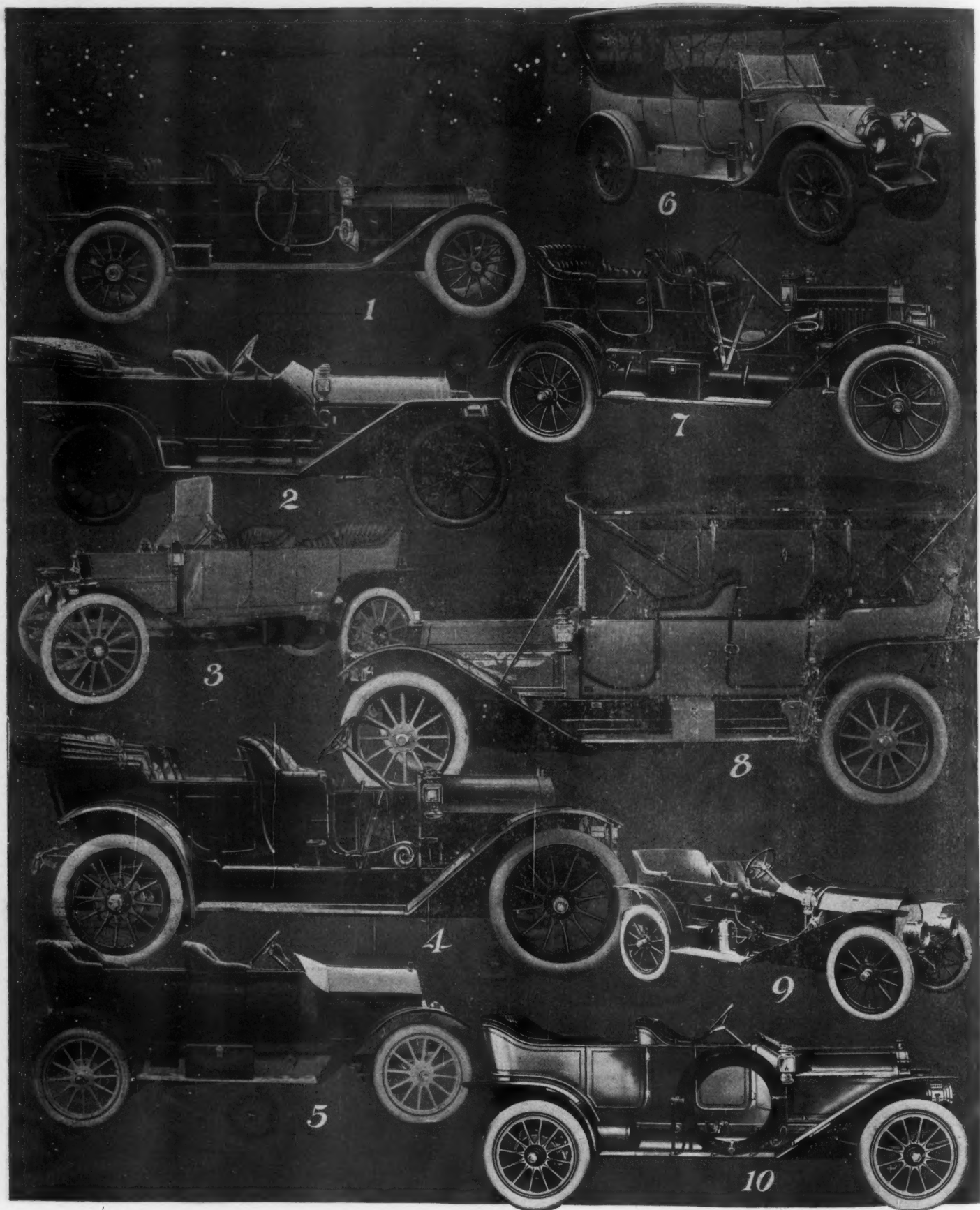
Is a Leader for This Year with All Manufacturers



These Cars Will Be Exhibited at Madison Garden

1—Regal Seven-Passenger Car; 2—Ohio Five-Passenger Car; 3—National Five-Passenger Car; 4—Selden Five-Passenger Car; 5—Moon Five-Passenger Car; 6—Selden Seven-Passenger Car; 7—Oakland Five-Passenger Car; 8—Garford Five-Passenger Car; 9—Stoddard-Dayton Seven-Passenger Car; 10—Franklin Five-Passenger Car

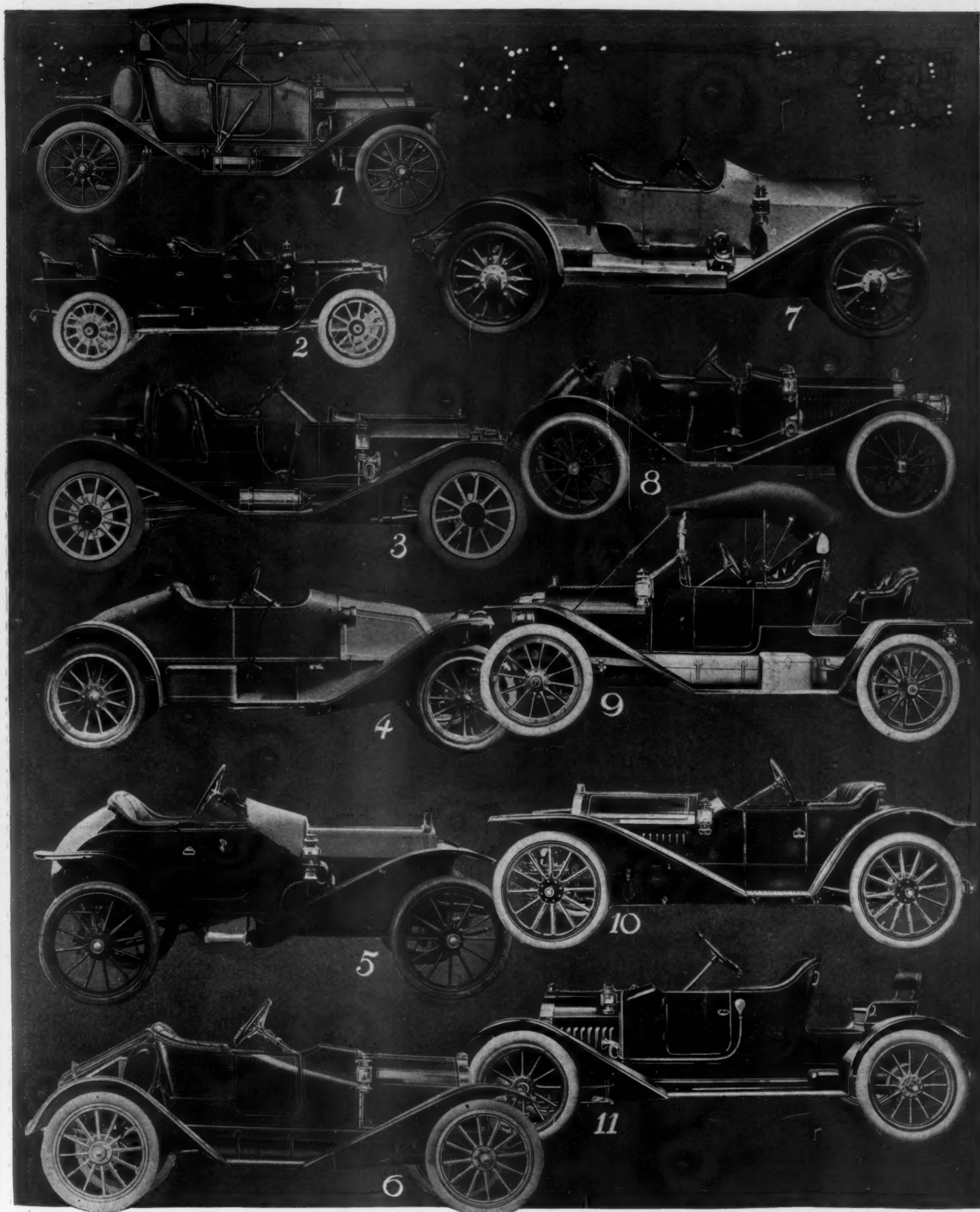
Practically Every Concern Has Its Fore-Door Model



Some Typical Fore-Door and Torpedo Body Types

1—Mitchell Seven-Passenger Car; 2—Matheson Four-Passenger Car; 3—Moline Four-Passenger Car; 4—Columbia Seven-Passenger Car; 5—Lambert Four-Passenger Torpedo; 6—Royal Tourist Seven-Passenger Car; 7—Lambert Four-Passenger Car; 8—Pierce-Arrow Seven-Passenger Car; 9—Mercer Four-Passenger Car; 10—Inter-State Four-Passenger Car

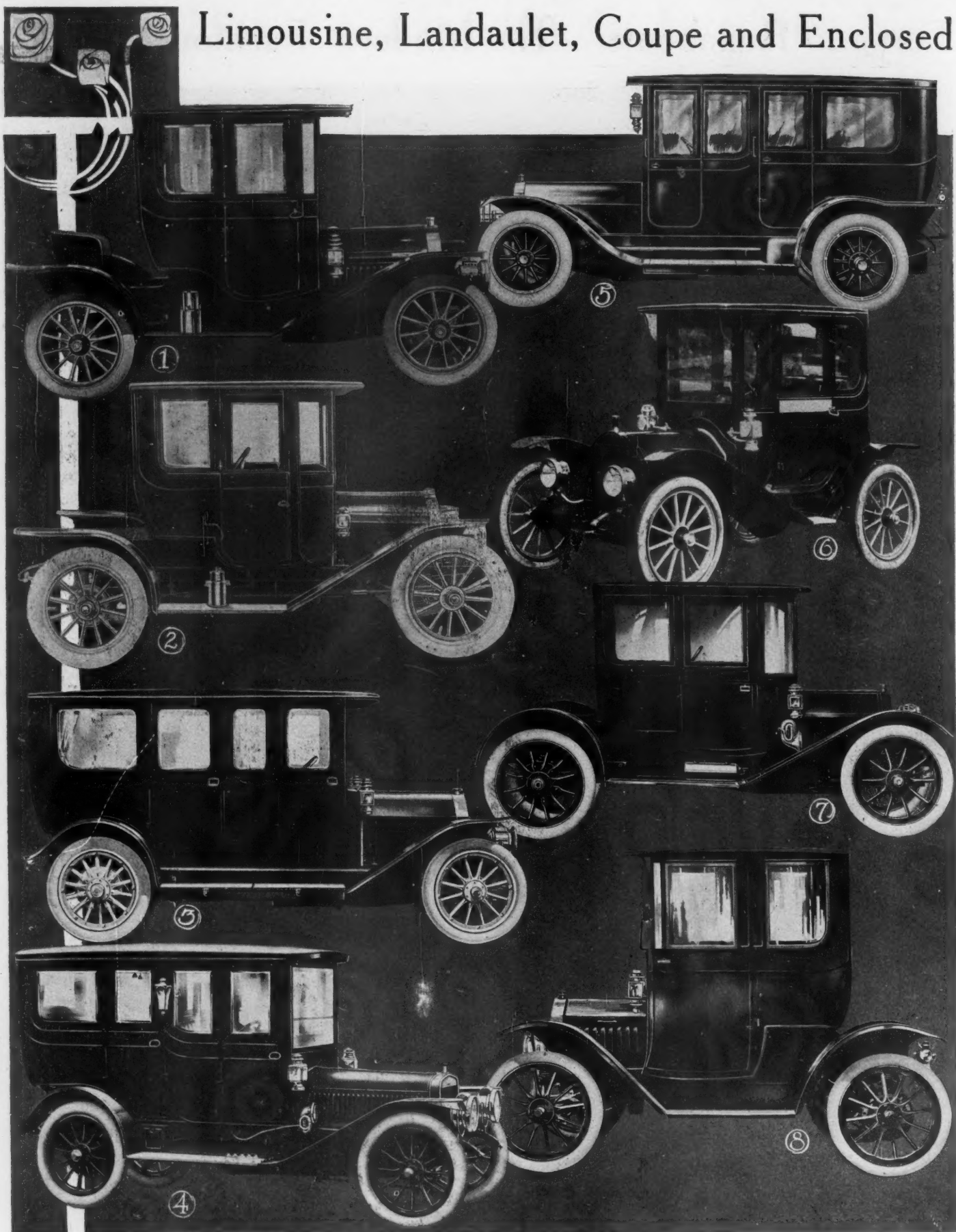
Torpedo Runabouts—The Modern Fashion Dictator



The Racy Fore-Door Torpedo Runabout Is Coming

1—McIntyre Two-Passenger Car; 2—Packard Five-Passenger Car; 3—Marmon Two-Passenger Car; 4—Franklin Two-Passenger Car; 5—Hupmobile Two-Passenger Car; 6—Overland Two-Passenger Car; 7—Stoddard-Dayton Two-Passenger Car; 8—Maxwell Two-Passenger Car; 9—Selden Three-Passenger Car; 10—Regal Two-Passenger Car; 11—Atlas Three-Passenger Car

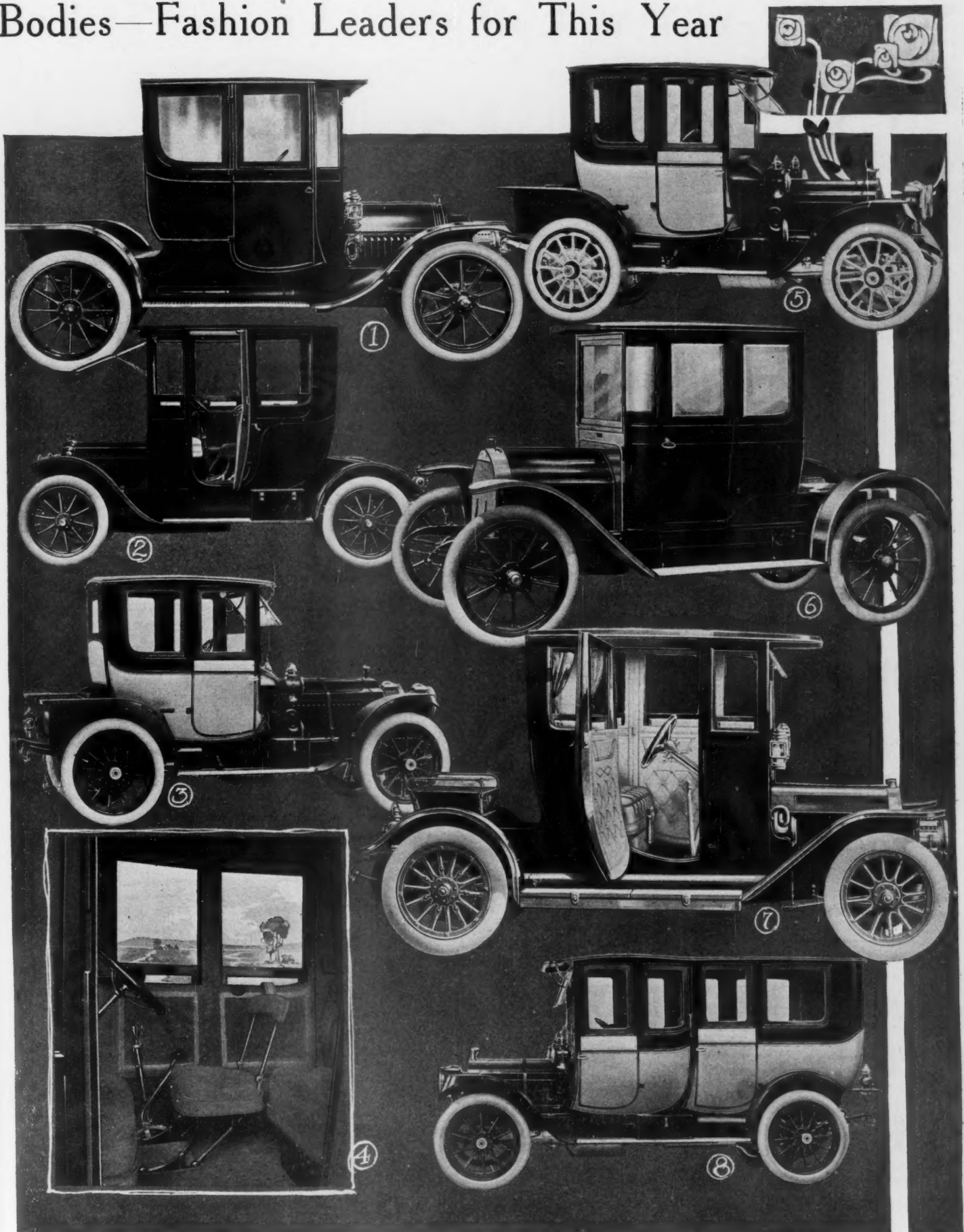
Limousine, Landaulet, Coupe and Enclosed



Aristocratic Fore-Door Closed Types Are Stylish

1—Regal 30 Coupe; 2—Overland Coupe; 3—Stoddard-Dayton 50 Limousine; 4—Winton 1911 Limousine; 5—Knox 60 Limousine; 6—Hupmobile Coupe; 7—Chalmers 30 Coupe; 8—Brush Coupe. The Fore-Door Limousines Are Popular and a Year Hence Every Maker of this Body Type Will Have Them Listed. They Offer Special Comforts to All

Bodies—Fashion Leaders for This Year



The Coupe Is Gaining for Winter Use in Cities

1—Everitt 30 Coupe; 2—White Four-Passenger Coupe; 3—Packard 30 Coupe; 4—Interior White Four-Passenger Coupe; 5—Packard 18 Coupe; 6—Moon 30 Coupe; 7—Stoddard-Dayton 30 Coupe; 8—Packard Fore-Door Limousine. The Interior Arrangements of the Limousine and Coupe Bodies Are Improving. The Telephone Is Used Instead of the Speaking Tube, and Fancy Leathers Are Being Used for the Entire Interior Decorations

Motor Specifications of Pleasure Cars Manufactured by Members A. L. A. M. for 1911 Season

Table No.	NAME	MODEL	No. Cylinders	Bore	Stroke	H. P. A. L. A. M.	Cyl. Vol.	Cyl. Type	Cyl. How Cast	Valve Location	COOLING			IGNITION			CARBURETER		Motor Lubrication		
											Type	Circulation	Radiator	Type	System	Magneto	Current Source	Control	Design	Gasoline Feed	
1	Alco	16	4	3 1/2	4 1/2	24.8	231.2	T	Pairs	Opp.	W	P	C	H.T.	Sing	Bosch	Mag. M & B.	Fixed	Own	Q	C
2	Alco	40	4	5 1/2	5 1/2	42.8	433.8	"	"	"	"	"	"	"	"	"	"	"	"	"	"
3	Alco	60	6	5 1/2	5 1/2	54.1	558.1	"	"	"	"	"	"	"	"	"	"	"	"	"	"
4	Alco	Traveler	4	4 1/2	4 1/2	46.0	469.2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
5	American	Roadster	4	5 1/2	5 1/2	46.0	469.2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
6	American	Tourist	4	5 1/2	5 1/2	46.0	469.2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
7	American	Road, Spec.	4	5 1/2	5 1/2	53.0	571.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
8	American	Speedster	4	5 1/2	5 1/2	53.0	571.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
9	American	Trav. Spec.	4	5 1/2	5 1/2	53.0	571.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
10	Amplex	Trav. H	4	5 1/2	5 1/2	53.0	571.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
11	Apperson	4-30	4	4 1/2	5	32.4	318.1	T	Sep.	Opp.	"	"	T	"	"	Eisenmann	"	"	Opt	Q	"
12	Apperson	4-40	4	4 1/2	5	38.1	375.2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
13	Apperson	4-50	4	4 1/2	5	48.4	475.2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
14	Atlas	4-30	4	4 1/2	4 1/2	33.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
15	Atlas	N	2	4 1/2	4 1/2	143.2	143.2	"	"	"	"	"	"	"	"	"	"	"	"	"	"
16	Autocar	XXIV	4	4 1/2	4 1/2	30.6	270.6	L	"	H&S Side Head	"	T	C	"	Sing	Bosch	M & B Dry C	"	Stromberg	"	M
17	Buick	E	4	4 1/2	4 1/2	22.5	225.6	"	"	"	"	"	"	"	"	"	"	"	"	"	"
18	Buick	21	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
19	Buick	20	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
20	Buick	27	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
21	Buick	32	4	4 1/2	4 1/2	22.5	225.6	"	"	"	"	"	"	"	"	"	"	"	"	"	"
22	Buick	33	4	4 1/2	4 1/2	22.5	225.6	"	"	"	"	"	"	"	"	"	"	"	"	"	"
23	Buick	38 & 30	4	4 1/2	4 1/2	32.4	318.1	"	"	"	"	"	"	"	"	"	"	"	"	"	"
24	Cadillac	21	4	4 1/2	4 1/2	22.5	225.6	"	"	"	"	"	"	"	"	"	"	"	"	"	"
25	Cadillac	H	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
26	Cartercar	R	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
27	Cartercar	M	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
28	Chalmers	18	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
29	Chalmers	19	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
30	Chalmers	40	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
31	Chalmers	40	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
32	Chalmers	40	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
33	Chalmers	40	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
34	Chalmers	40	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
35	Chalmers	40	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
36	Columbia	Mark 85	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
37	Columbia	Mark 85	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
38	Columbia	Mark 85	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
39	Columbia	Mark 85	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
40	Columbia	Mark 85	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
41	E-M-F	30	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
42	E-M-F	30	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
43	E-M-F	30	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
44	E-M-F	30	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
45	E-M-F	30	4	4 1/2	4 1/2	25.6	256.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
46	Franklin	D	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
47	Franklin	M	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
48	Franklin	G	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
49	Franklin	G	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
50	Franklin	G-8	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
51	Garford	G-S	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
52	Garford	Glide	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
53	Garford	Glide	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
54	Garford	Glide	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
55	Garford	Glide	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
56	Great Smith	E & B	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
57	Haynes	20	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
58	Haynes	Y	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
59	Hudson	33	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
60	Hudson	26	4	4 1/2	4 1/2	28.0	283.3	"	"	"	"	"	"	"	"	"	"	"	"	"	"
61	Humobile	Tour.	4	4 1/2	4 1/2	16.9	112.0	"	"	"	"	"	"	"	"	"	"	"	"	"	"
62	Humobile	Inter-State	4	4 1/2	4 1/2	16.9	112.0	"	"	"	"	"	"	"	"	"	"	"	"	"	"
63	Inter-State	Tour.	4	4 1/2	4 1/2	16.9	112.0	"	"	"	"	"	"	"	"	"	"	"	"	"	"
64	Inter-State	Tour.	4	4 1/2	4 1/2	16.9	112.0	"	"	"	"	"	"	"	"	"	"	"	"	"	"
65	Jackson	51	4	4 1/2	4 1/2	16.9	112.0	"	"	"	"	"	"	"	"	"	"	"	"	"	"

ABBREVIATIONS: Model: Road, Roadster, Run, Runabout, Tour, Touring Car, Speed, Speedster, Race, Raceabout. Cyl. Type: T, Tee-Head; L, L-Head; H, Valve in the Head; *Two-Cycle Engine. Cooling Type: A, Air-Cooled; W, Water-Cooled. Radiator: C, Calumet or Honeycomb; L, Tubular. Ignition Type: H, T, High Tension; L, T, Low Tension; M, P, Magneto Spark Plug. Ignition System: M & B, Make-and-Break; Current Source: M, Magneto; B, Storage Battery; C, Dry Cells. D, Delco; A-K, Atwater-Kent Gen. Gasoline Feed: P, Pressure; G, Gravity. Motor Lubrication: M, Mech. Oil; C, Circulating; F, Fly-wheel Oil; V, Vacuum; G, Oil Fed with Fuel; P, Compression Oil.

Clutch, Gearset and Chassis Specifications of A. L. A. M. Pleasure Cars for 1911 Season

Table No.	NAME	MODEL	TRANSMISSION			BRAKES			RUNNING GEAR				BEARINGS												
			CLUTCH	GEARSET		Drive	Car Drives Thru	Rear Axle	Service	Em.	Wheel Base	Front Tires	Rear Tires	Front Spgs	Rear Springs	Front Axle	Crankshaft	Cam-shaft	Gearset	Front Wheel	Rear Axle	Clutch Sp'dle	Clutch Thrust	Str'ng Kn'dle	Str'ng Gears
			Type	Fric'tion Surface	Type	No. Spds	Loc.										Type	No.	Type	No.					
66	Jackson	41	M. D.	L.	Sel.	3	U. M.	S	Semi F.	Int.	110	34x4	34x4	El	El	I	Plain	3	Ball	Ball	B&R	Plain	Plain	Plain	Ball
67	Jackson	38	"	"	"	3	"	"	Live	"	115	34x4	34x4	"	"	"	P&B	3	"	"	R&B	"	"	"	"
68	Jackson	30	"	"	"	3	Amid	"	"	"	105	32x34	32x34	"	"	"	Plain	2	Plain	Plain	"	"	"	"	"
69	Jackson	25	"	"	"	4	"	S	Float	"	105	32x34	32x34	"	"	"	"	4	Ball	Ball	Roll	"	"	"	P&B
70	Kisselcar	F-11	Cone	L. & I	"	"	"	"	"	"	132	36x44	36x44	1/2 El	1/2 El	"	"	"	3	"	"	"	"	"	"
71	Kisselcar	D-11	"	"	"	4	"	"	"	"	124	36x44	36x44	"	"	"	"	"	3	"	"	"	"	"	"
72	Kisselcar	LD-11	"	"	"	3	"	"	"	"	116	34x4	34x4	"	"	"	"	"	3	"	"	"	"	"	"
73	Knox	R-Race	M. D.	L.	"	3	U. M.	R	Semi F	Ext.	104	Opt.	Opt.	1/2 El	1/2 El	"	"	"	3	"	"	"	"	"	Roll
74	Knox	R	"	"	"	3	"	"	"	"	117	36x44	36x44	"	"	"	"	"	3	"	"	"	"	"	"
75	Knox	R	"	"	"	3	"	TR&R	Float	"	122	36x44	36x44	"	"	"	"	"	3	"	"	"	"	"	"
76	Knox	S-Race	"	"	"	2	"	"	"	"	106	Opt.	Opt.	"	"	"	"	"	4	"	"	"	"	"	"
77	Knox	S	"	"	"	3	"	TR&R	Float	"	134	38x54	38x54	"	"	"	"	"	4	"	"	"	"	"	"
78	Lambert	77	Fric't.	A. & P.	Fric't.	3	"	R	Semi F.	"	106	32x34	32x34	"	"	"	Ball	2	"	"	"	"	"	"	"
79	Lambert	101	"	"	"	"	"	"	"	"	112	33x4	33x4	"	"	"	"	"	2	"	"	"	"	"	"
80	Lambert	88	"	"	"	"	"	"	"	"	112	32x34	32x34	"	"	"	"	"	2	"	"	"	"	"	"
81	Lambert	100	"	"	"	"	"	"	"	"	115	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
82	Lambert	44 & 45	"	"	"	"	"	"	"	"	102	30x34	30x34	"	"	"	"	"	3	"	"	"	"	"	"
83	Locomobile	L	Cone	L	Sel.	4	Amid	S	Ext.	"	120	34x44	34x44	"	"	"	Plain	5	Ball	Roll	"	"	"	"	Plain
84	Locomobile	M	"	"	"	4	"	"	"	"	135	36x4	37x5	"	"	"	"	"	5	"	Ball	"	"	"	"
85	Lozier	46	"	"	"	"	"	"	"	"	124	36x4	36x5	"	"	"	"	"	5	"	"	"	"	"	"
86	Lozier	51	"	"	"	"	"	"	"	"	131	36x4	36x5	"	"	"	"	"	5	"	"	"	"	"	"
87	McIntyre	M-5	"	"	"	"	"	"	"	"	125	30x3	30x3	"	"	"	"	"	2	"	"	"	"	"	"
88	McIntyre	A-4	"	"	"	"	"	"	"	"	97	30x3	30x3	"	"	"	"	"	2	"	"	"	"	"	"
89	McIntyre	A-5	"	"	"	"	"	"	"	"	110	32x3	32x3	"	"	"	"	"	2	"	"	"	"	"	"
90	Marion	30	"	"	"	"	"	"	"	"	110	32x34	32x34	"	"	"	"	"	2	"	"	"	"	"	"
91	Marion	40	"	"	"	"	"	"	"	"	115	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
92	Marion	32	"	"	"	"	"	"	"	"	120	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
93	Matheson	18	"	"	"	"	"	"	"	"	120	36x4	36x4	"	"	"	"	"	2	"	"	"	"	"	"
94	Maxwell	A-B	"	"	"	"	"	"	"	"	86	28x3	28x3	"	"	"	"	"	2	"	"	"	"	"	"
95	Maxwell	I	"	"	"	"	"	"	"	"	104	32x34	32x34	"	"	"	"	"	2	"	"	"	"	"	"
96	Maxwell	E-A	"	"	"	"	"	"	"	"	110	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
97	Maxwell	35	"	"	"	"	"	"	"	"	108	32x34	32x34	"	"	"	"	"	2	"	"	"	"	"	"
98	Maxwell	20-C	"	"	"	"	"	"	"	"	115	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
99	Maxwell	R	"	"	"	"	"	"	"	"	100	32x34	32x34	"	"	"	"	"	2	"	"	"	"	"	"
100	Mitchell	T	"	"	"	"	"	"	"	"	115	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
101	Mitchell	S	"	"	"	"	"	"	"	"	115	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
102	Mitchell	M-35	"	"	"	"	"	"	"	"	120	36x4	36x4	"	"	"	"	"	2	"	"	"	"	"	"
103	Moline	30	"	"	"	"	"	"	"	"	112	36x34	36x34	"	"	"	"	"	2	"	"	"	"	"	"
104	Moon	30	"	"	"	"	"	"	"	"	114	34x34	34x34	"	"	"	"	"	2	"	"	"	"	"	"
105	Moon	45	"	"	"	"	"	"	"	"	121	36x4	36x4	"	"	"	"	"	2	"	"	"	"	"	"
106	National	40	"	"	"	"	"	"	"	"	124	36x4	36x4	"	"	"	"	"	2	"	"	"	"	"	"
107	National	K-Special	"	"	"	"	"	"	"	"	112	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
108	National	33	"	"	"	"	"	"	"	"	100	32x34	32x34	"	"	"	"	"	2	"	"	"	"	"	"
109	National	24	"	"	"	"	"	"	"	"	96	32x34	32x34	"	"	"	"	"	2	"	"	"	"	"	"
110	National	49	"	"	"	"	"	"	"	"	115	34x4	34x4	"	"	"	"	"	2	"	"	"	"	"	"
111	Oldsmobile	Limited	"	"	"	"	"	"	"	"	188	42x44	42x44	"	"	"	"	"	4	"	"	"	"	"	"
112	Oldsmobile	Autocrat	"	"	"	"	"	"	"	"	124	38x44	38x44	"	"	"	"	"	4	"	"	"	"	"	"
113	Oldsmobile	Special	"	"	"	"	"	"	"	"	118	36x4	36x4	"	"	"	"	"	3	"	"	"	"	"	"
114	Oldsmobile	45-46	"	"	"	"	"	"	"	"	118	36x4	36x4	"	"	"	"	"	3	"	"	"	"	"	"
115	Overland	49	"	"	"	"	"	"	"	"	96	32x3	32x3	"	"	"	"	"	3	"	"	"	"	"	"
116	Overland	50-51	"	"	"	"	"	"	"	"	102	32x34	32x34	"	"	"	"	"	3	"	"	"	"	"	"
117	Overland	52-54	"	"	"	"	"	"	"	"	110	34x34	34x34	"	"	"	"	"	3	"	"	"	"	"	"
118	Packard	30	"	"	"	"	"	"	"	"	118	34x4	34x4	"	"	"	"	"	3	"	"	"	"	"	"
119	Packard	20	"	"	"	"	"	"	"	"	124	36x44	36x44	"	"	"	"	"	3	"	"	"	"	"	"
120	Packard	18	"	"	"	"	"	"	"	"	112	34x4	34x4	"	"	"	"	"	3	"	"	"	"	"	"
121	Packard	18	"	"	"	"	"	"	"	"	102	34x4	34x4	"	"	"	"	"	3	"	"	"	"	"	"
122	Palmer Singer	6-40	"	"	"	"	"	"	"	"	138	36x4	36x4	"	"	"	"	"	3	"	"	"	"	"	"
123	Palmer Singer	4-50	"	"	"	"	"	"	"	"	129	36x4	36x4	"	"	"	"	"	3	"	"	"	"	"	"
124	Palmer Singer	6-40	"	"	"	"	"	"	"	"	120	34x4	34x4	"	"	"	"	"	3	"	"	"	"	"	"
125	Palmer Singer	Town Car	"	"	"	"	"	"	"	"	132	36x44	36x44	"	"	"	"	"	3	"	"	"	"	"	"
126	Peerless	29	"	"	"	"	"	"	"	"	113	34x4	34x4	"	"	"	"	"	3	"	"	"	"	"	"
127	Peerless	31	"	"	"	"	"	"	"	"	123	36x4	36x4	"	"	"	"	"	3	"	"	"	"	"	"
128	Peerless	31 Road	"	"	"	"	"	"	"	"	114	36x4	36x4	"	"	"	"	"	3	"	"	"	"	"	"
129	Peerless	32	"	"	"	"	"	"	"	"	136	36x44	36x44	"	"	"	"	"	3	"	"	"	"	"	"
130	Peerless	32 Road	"	"	"	"	"	"	"	"	132	36x44	36x44	"	"	"	"	"	3	"	"	"	"	"	"

ABBREVIATIONS:—Model: Road, Roadster, Runabout, Touring Car, Speed, Speedster, Race, Raceabout. Clutch: M. D., Multiple Disk; Exp. B., Expanding Band; Con. B., Contracting Band; S., Steel; B., Bronze; I., Iron; L., Leather; AL, Aluminum; A., Asbestos; R., Raybestos; T., Thermoid; C., Cork; Spec., Special Composition. Location: Amid., Amidships; U. M., Unit with Motor; U. C., Unit with Clutch; R. A., Rear Axle. Car Drives Through: R., Radius Rod; T., Torsion Tube; T. R., Torsion Rod; S., Springs. Brakes: Int., Internal Expanding; Ext., External Expanding; J. S., on Jack Shaft; T., on Transmission. Springs: El., Elliptic; Plat., Platform. Front Axle: C., Channel Section; T., Tubular; L., L-Beam; W., Wood.

Motor Specifications of Pleasure Cars Manufactured by Members A. L. A. M. for 1911 Season

Table No.	NAME	MODEL	No. Cylinders	Bore	Stroke	H. P. A. L. A. M.	Cyl. Vol.	Cyl. Type	Cyl. How Cast	Valve Location	COOLING			IGNITION			CARBURETOR		Motor Lubrication		
											Type	Circulation	Radiator	Type	System	Magneto	Current Source	Control	Design	Gasoline Feed	
131	Pierce-Arrow	36-R	6	4	5 1/2	38.4	386.4	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
132	Pierce-Arrow	36-T	6	4	5 1/2	38.4	386.4	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
133	Pierce-Arrow	48-R	6	4 1/2	5 1/2	48.6	524.8	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
134	Pierce-Arrow	48-T	6	4 1/2	5 1/2	48.6	524.8	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
135	Pierce-Arrow	66-R	6	5 1/2	5 1/2	66.2	714.3	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
136	Pierce-Arrow	66-T	6	5 1/2	5 1/2	66.2	714.3	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
137	Pope-Hartford	W	6	4 1/2	5 1/2	38.9	389.9	H	Pairs	Head	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
138	Pope-Hartford	Y	6	4 1/2	5 1/2	44.6	471.0	H	Pairs	Head	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
139	Premier	6-60	6	4 1/2	5 1/2	48.6	501.0	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
140	Premier	4-40	4	4 1/2	5 1/2	32.4	334.0	T	Pairs	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
141	Pullman	M-11	4	5 1/2	6	44.1	519.5	L	Sep Pairs	L Side	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
142	Pullman	O-11	4	5 1/2	6	25.9	255.9	L	Sep Pairs	L Side	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
143	Pullman	K-11	4	4 1/2	4 1/2	32.4	302.2	L	Sep Pairs	L Side	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
144	Regal	H-G	4	4 1/2	5 1/2	40.0	412.3	L	Bloc	L Side	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
145	Regal	N	4	3 1/2	4 1/2	22.5	198.8	L	Bloc	L Side	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
146	Regal	Y	4	4	4 1/2	25.6	213.6	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
147	Regal	S	4	4 1/2	5 1/2	32.4	318.1	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
148	Regal	K	4	4 1/2	5 1/2	22.5	187.7	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
149	Regal	R	4	4 1/2	5 1/2	25.6	226.2	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
150	Regal	R	4	4 1/2	5 1/2	25.6	226.2	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
151	Regal	S	4	4	4 1/2	25.6	226.2	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
152	Royal Tour	M-3	4	4 1/2	5 1/2	44.1	519.5	L	Sep Pairs	L Side	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
153	Saunders	41-46-40R	4	4 1/2	5 1/2	25.6	226.2	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
154	Saunders	41-46-40R	4	4 1/2	5 1/2	25.6	226.2	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
155	Saunders	41-46-40R	4	4 1/2	5 1/2	25.6	226.2	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
156	Saunders	41-46-40R	4	4 1/2	5 1/2	25.6	226.2	L	Pairs	H & S	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
157	Speedwell	40-T	4	4 1/2	5 1/2	36.1	351.4	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
158	Speedwell	A	4	4 1/2	5 1/2	36.1	351.4	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
159	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
160	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
161	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
162	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
163	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
164	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
165	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
166	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
167	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
168	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
169	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
170	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
171	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
172	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
173	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
174	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
175	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
176	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
177	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
178	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
179	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
180	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
181	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
182	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
183	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
184	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
185	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
186	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
187	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
188	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C
189	Speedwell	50	4	4 1/2	5 1/2	53.0	517.2	L	Bloc	Opp	W	P	C	H	Double	Bosch	M & B	Hand	Own	G	C

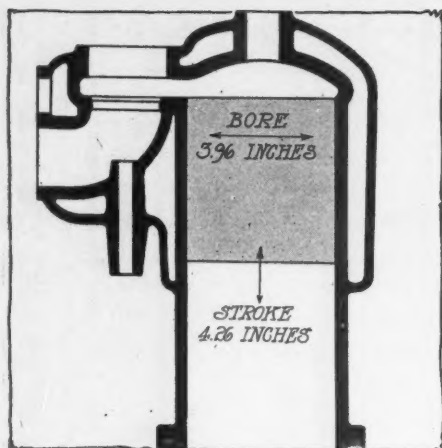
ABBREVIATIONS: Model: Road, Roadster, Runabout, Tour, Touring, Car, Speed, Speedster, Race, Raceabout, Cylinder Type: T, Tee-Head; L, L-Head; H, Valve in the Head; *Two-Cycle Engine. Cooling Type: A, Air-Cooled; W, Water-Cooled. Radiator: C, Cellular or Honeycomb; T, Tubular. Ignition Type: H, High Tension; L, Low Tension; M, P, Magneto; M, Make-and-Break; Current Source: M, Magneto; B, Storage Battery; C, Dry Cells; D, Delco; A-K, Atwater-Kent Gen. Gasoline Feed: P, Pressure; G, Gravity. Motor Lubrication: M, Mech. Oil; C, Circulating; F, Fly-wheel Oil; V, Vacuum; G, Oil Fed with Fuel; P, Compression Oil.

Clutch, Gearset and Chassis Specifications of A. L. A. M. Pleasure Cars for 1911 Season

Table No.	NAME	MODEL	TRANSMISSION				BRAKES				RUNNING GEAR				BEARINGS			
			GEARSET				Service	Em.	Wheel Base	Front Tires	Rear Tires	Front Spgs	Rear Springs	Front Axle	Crankshaft	Gearset	Front Wheel	Rear Axle
			Type	Friction Surface	Type	No. p/sets												
131	Pierce-Arrow.....	36-R	Cone	B. & L.	S. L.	4	Amid.	Ext.	119	36x4	36x4	1/2 El	1/2 El	I	Plain	Roll	Roll	R. & R.
132	Pierce-Arrow.....	36-T	"	"	"	4	"	"	125	36x4	36x4	"	"	"	"	"	"	"
133	Pierce-Arrow.....	48-R	"	"	"	4	"	"	125	36x4	36x4	"	"	"	"	"	"	"
134	Pierce-Arrow.....	48-T	"	"	"	4	"	"	134	36x4	36x4	"	"	"	"	"	"	"
135	Pierce-Arrow.....	66-R	"	L. & S.	"	4	"	"	135	36x4	36x4	"	"	"	"	"	"	"
136	Pierce-Arrow.....	66-T	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
137	Pierce-Arrow.....	66-T	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
138	Pierce-Arrow.....	66-T	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
139	Pierce-Arrow.....	66-T	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
140	Pierce-Arrow.....	66-T	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
141	Pullman.....	M-11	Cone	L. & L.	"	4	"	Ext.	127	36x4	36x4	"	"	"	"	Roll	Roll	Roll
142	Pullman.....	O-11	"	"	"	4	"	"	127	36x4	36x4	"	"	"	"	"	"	"
143	Pullman.....	K-11	"	"	"	4	"	"	115	36x4	36x4	"	"	"	"	"	"	"
144	Pullman.....	H-G	"	"	"	4	"	"	115	36x4	36x4	"	"	"	"	"	"	"
145	Pullman.....	N	"	"	"	4	"	"	100	36x4	36x4	"	"	"	"	"	"	"
146	Regal.....	Y	"	"	"	3	"	"	110	36x4	36x4	"	"	"	"	"	"	"
147	Regal.....	S	"	"	"	3	"	"	123	36x4	36x4	"	"	"	"	"	"	"
148	Regal.....	K	"	"	"	3	"	"	123	36x4	36x4	"	"	"	"	"	"	"
149	Regal.....	R	"	"	"	3	"	"	123	36x4	36x4	"	"	"	"	"	"	"
150	Regal.....	R	"	"	"	3	"	"	123	36x4	36x4	"	"	"	"	"	"	"
151	Reo.....	S	Cone	L. & L.	"	4	"	"	108	36x4	36x4	"	"	"	"	"	"	"
152	Reo.....	M-3	"	"	"	4	"	"	126	36x4	36x4	"	"	"	"	"	"	"
153	Reo.....	35	"	"	"	4	"	"	126	36x4	36x4	"	"	"	"	"	"	"
154	Reo.....	44-40-40R	"	"	"	4	"	"	126	36x4	36x4	"	"	"	"	"	"	"
155	Reo.....	40-S	"	"	"	4	"	"	122	36x4	36x4	"	"	"	"	"	"	"
156	Selden.....	40-T	"	"	"	3	"	"	116	36x4	36x4	"	"	"	"	"	"	"
157	Selden.....	A	"	"	"	3	"	"	116	36x4	36x4	"	"	"	"	"	"	"
158	Selden.....	50	"	"	"	4	"	"	124	36x4	36x4	"	"	"	"	"	"	"
159	Selden.....	50	"	"	"	4	"	"	124	36x4	36x4	"	"	"	"	"	"	"
160	Selden.....	90	"	"	"	4	"	"	124	36x4	36x4	"	"	"	"	"	"	"
161	Selden.....	90	"	"	"	4	"	"	124	36x4	36x4	"	"	"	"	"	"	"
162	Speedwell.....	11	Cone	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
163	Speedwell.....	7-Pass	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
164	Speedwell.....	Cruiser	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
165	Speedwell.....	Chain-R	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
166	Speedwell.....	Chain-R	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
167	Speedwell.....	Chain-R	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
168	Speedwell.....	Chain-R	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
169	Speedwell.....	Chain-R	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
170	Speedwell.....	Chain-R	"	"	"	3	"	"	121	36x4	36x4	"	"	"	"	"	"	"
171	Stevens-Dur.....	A-A	"	"	"	3	"	"	128	36x4	36x4	"	"	"	"	"	"	"
172	Stevens-Dur.....	20	"	"	"	3	"	"	128	36x4	36x4	"	"	"	"	"	"	"
173	Stevens-Dur.....	30	"	"	"	3	"	"	128	36x4	36x4	"	"	"	"	"	"	"
174	Stevens-Dur.....	40	"	"	"	3	"	"	128	36x4	36x4	"	"	"	"	"	"	"
175	Stevens-Dur.....	40	"	"	"	3	"	"	128	36x4	36x4	"	"	"	"	"	"	"
176	Stevens-Dur.....	50	"	"	"	3	"	"	130	36x4	36x4	"	"	"	"	"	"	"
177	Stevens-Dur.....	50	"	"	"	3	"	"	130	36x4	36x4	"	"	"	"	"	"	"
178	Stevens-Dur.....	50	"	"	"	3	"	"	130	36x4	36x4	"	"	"	"	"	"	"
179	Stevens-Dur.....	50	"	"	"	3	"	"	130	36x4	36x4	"	"	"	"	"	"	"
180	Stevens-Dur.....	50	"	"	"	3	"	"	130	36x4	36x4	"	"	"	"	"	"	"
181	Thomas.....	K	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
182	Thomas.....	M	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
183	Thomas.....	M	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
184	Thomas.....	White	"	"	"	4	"	"	140	36x4	36x4	"	"	"	"	"	"	"
185	White.....	G-E 7 Pass	"	"	"	4	"	"	120	36x4	36x4	"	"	"	"	"	"	"
186	White.....	G-A	"	"	"	4	"	"	110	36x4	36x4	"	"	"	"	"	"	"
187	White.....	G-A	"	"	"	4	"	"	110	36x4	36x4	"	"	"	"	"	"	"
188	White.....	G-B	"	"	"	4	"	"	120	36x4	36x4	"	"	"	"	"	"	"
189	White.....	17-R	"	"	"	4	"	"	124	36x4	36x4	"	"	"	"	"	"	"

ALBREVATIONS: Model: Road, Roadster, Runabout, Touring Car, Speed, Speedster, Race, Raceabout, Clutch: M. D., Multiple Disk; Exp. B., Expanding Band; Con. B., Contracting Band; Gearset: S., Steel; B., Bronze; L., Iron; L., Leather. AL, Aluminum; A., Asbestos; R., Raceabout; T., Thermoid; C., Cork; Spec., Special Composition. Location: U. C., Unit with Motor; U. C., Unit with Clutch; R. A., Rear Axle. Car Drives Through: R., Radius Rods; T., Torsion Tube. TR, Torsion Rod; S., Springs. Brakes: Int., Internal Expanding; Ext., External Contracting; J. S., on Jack Shaft; T., on Transmission. Springs: EL, Elliptic; Plat., Platform. Front Axle: C., Channe Section; T., Tubular; L., L-Beam; W., Wood.

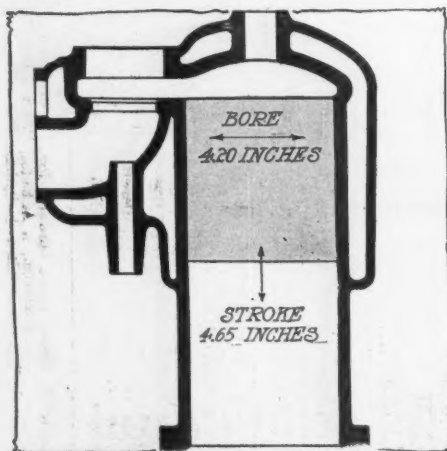
Motor Tendencies for 1911 as Exemplified at the



CYLINDER AVERAGE \$1,000 CAR

NINETEEN-ELEVEN will not be such a phenomenal long-stroke year as was expected. So far as the exhibitors at the Garden show are concerned, of the 121 motors, ninety-two have the motor stroke in excess of the bore; twenty are of the square type, that is, with the bore and stroke the same; and only nine have the stroke shorter than the bore. From these figures there are ten times as many chassis that favor the long stroke as pin their faith to the short, and between these is the intermediate field of twenty employing the square motor. Of the 121 different motors, the average bore is 4.48 inches and the average stroke 4.88 inches, so that all told we are in a long-stroke era; at least the leaning is in that direction.

It is questionable if it is advisable to use the long stroke as yet when speaking of the American industry. The chassis leading in this long-stroke field is the Moline, with 6-inch bore and 4-inch stroke, the stroke having been increased from 4½ to 6 inches for this year. This motor has a ratio of 1½ to 1, that is, the stroke is 50 per cent in excess of the bore. In all ratio figures given herewith, as well as in the tabulation, the stroke is given first



CYLINDER AVERAGE \$1,500 CAR

in the ratio column. A close second to the Moline in the long-stroke field is the Simplex, with 4½ by 6½-inch cylinders, making its ratio 1.33 to 1. The third is the Thomas, with 4¼ by 5½-inch cylinders, giving a ratio of 1.3 to 1. Next comes the Overland, 3½ by 4½, which is 1.29 to 1. In close sequence are the Pierce-Arrow, Stoddard, and Packard.

In the ninety-two motors with the long stroke, many of the leading names of the industry are found, including Pierce-Arrow, Packard, Peerless, Lozier, Haynes,

Columbia, Stevens-Duryea, Apperson, Winton, Marmon, Overland, Chalmers, National, Premier, Alco, White, Franklin, Stearns, Stoddard, Kisselkar, Moon, Royal Tourist, Palmer & Singer, etc. It is noticeable that the different companies are not consistent in the ratio of stroke to bore in their different models, it being common where a concern builds three models to have them all with the stroke longer than the bore, or vice versa. There are cases, however, where the same concern figures in all three classes, one example

FOUR AVERAGE A. L. A. M. CARS FOR 1911

In this table all of the cars of manufacturers who are members of the Association of Licensed Automobile Manufacturers are divided into four classes, namely, \$1,000, \$1,500, \$2,500 and \$4,000. The cars in the \$1,000 class, those selling from \$1 to \$1,250, are included. In the \$1,500 class those selling from \$1,251 to \$2,250 are counted. The range of the \$2,500 car is from \$2,251 to \$3,000. The \$4,000 car includes all over \$3,001. In each class the average of the wheelbases of all cars in the class is taken and is given here. In every other detail it is the average of all the cars in a class that is given (or used in finding the percentage) in each column of the table.

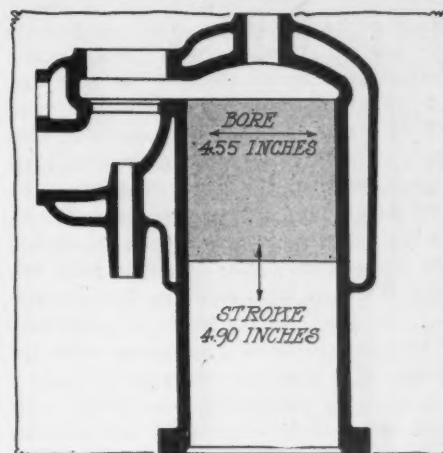
	\$1,000 car	\$1,500 car	\$2,500 car	\$4,000 car
Wheelbase	101½	113	119	123
Front wheel	31.8x3.4	33.7x3.9	35.0x4.0	36.2x4.3
Rear wheel	31.8x3.4	33.7x3.9	35.0x4.1	37.6x4.6
Price of car	\$1,002	\$1,585	\$2,490	\$4,650
Motor				
Number of cylinders—				
One	Percentage 3	..	..	..
Two	Percentage 10	..	..	..
Four	Percentage 87	97	95	65
Six	Percentage ..	3	5	35
Average bore	3.96	4.20	4.55	4.90
Average stroke	4.26	4.65	4.90	5.28
Average A. L. A. M.	22.6	28.6	33.9	44.0
Average piston displacement ..	195.5	261.6	326.8	468.6
T-type	Percentage 6	13	28	48
L-type	Percentage 68	58	49	29
Valve-in-head	Percentage 23	26	20	23
Two-cycle	Percentage 3	3	3	..
Cylinders cast separately	Percentage 31	20	20	14
Cylinders cast in pairs	Percentage 47	60	72	82
Cylinders cast en bloc	Percentage 22	20	8	3
Cylinders cast in threes	Percentage ..	..	..	1
Air-cooled	Percentage ..	6	3	5
Water-cooled	Percentage 100	94	97	95
Thermo-syphon	Percentage 50	33	3	..
Pump circulating	Percentage 50	66	97	100
Tubular radiator	Percentage 75	80	35	24
Cellular radiator	Percentage 25	20	65	76
Ignition—				
High-tension single	Percentage 25	16	13	11
High-tension dual	Percentage 66	71	44	44
High-tension double	Percentage 9	13	43	43
Make-and-break	Percentage ..	..	..	1
Low-tension single	Percentage ..	..	..	1
Carbureter—				
Gravity feed	Percentage 94	90	80	55
Pressure feed	Percentage 6	10	20	45
Lubrication—				
Compression oiler	Percentage 3	..	..	..
Circulating pump	Percentage 75	84	87	71
Gravity pump	Percentage ..	..	..	5
Mechanical oiler	Percentage 19	10	10	24
Circulating flywheel	Percentage 3	6	3	..
Clutch—				
Multiple-disk	Percentage 60	50	33	56
Cone	Percentage 30	38	54	36
Internal band	Percentage ..	..	..	2
External band	Percentage ..	..	10	6
None	Percentage 10	12	..	..
Gearset—				
Selective	Percentage 74	85	95	97
Two forward speeds	Percentage 17	..	..	..
Three forward speeds	Percentage 83	100	85	38
Four forward speeds	Percentage ..	..	15	62
Progressive	Percentage ..	3	5	3
Two forward speeds	Percentage ..	..	..	..
Three forward speeds	Percentage ..	100	100	100
Four forward speeds	Percentage ..	..	..	..
Planetary	Percentage 16	..	..	..
Two forward speeds	Percentage 80	..	..	..
Three forward speeds	Percentage 20	..	..	..
Friction	Percentage 10	12	..	..
Drive—				
Shaft	Percentage 84	87	100	91
Chain	Percentage 16	13	..	9

Licensed Motor Car Show in Madison Square Garden

being the Kisselkar, with one motor $4\frac{1}{2}$ bore, $4\frac{1}{4}$ stroke, a ratio of 1.05 to 1; another, $4\frac{1}{4}$ inches, bore and stroke, or 1 to 1; and a third $4\frac{7}{8}$ -inch bore, $4\frac{1}{4}$ -inch stroke, being a ratio of .97 to 1.

Compared with those concerns which have motor sizes placing them in all three divisions of the stroke-to-bore category, there are concerns building two models, but having the same ratio in both. One example is the Locomobile, in which square cylinders are used in both the four and six-cylinder cars, the size being $4\frac{1}{2}$

inches bore and stroke, giving a ratio of 1 to 1. Before dismissing the question of the square cylinder, it should not be overlooked that the smallest one in the licensed ranks is the Buick, $3\frac{3}{4}$ inches, and the largest is the Simplex, $5\frac{3}{4}$ inches. With the exception of three motors, all of the square type range from 4 to $4\frac{1}{4}$ inches in size. The fast car with a bore in excess of the stroke is limited. There are in all but nine chassis types and some of these are special racing creations, such as the Simplex, with bore 6.1 and stroke



CYLINDER AVERAGE \$2,500 CAR

CYLINDER SIZES OF A. L. A. M. MOTORS FOR 1911

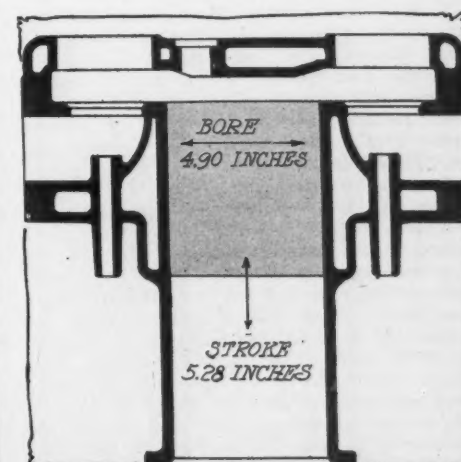
This table gives the bore and stroke in inches of all the motors used by licensed automobile manufacturers. The last column gives the ratio of the length of the stroke to the bore (inside diameter of the cylinder), and is found by dividing the stroke by the bore. The Moline motor, for instance, has a stroke $1\frac{1}{2}$ times as great as the bore, and the ratio is therefore 1.5 to 1. The so-called "square motors" are those in which the bore is equal to the stroke, and the ratio is 1 to 1. Some makers have motors with different ratios, and their names appear under each ratio.

Car	Bore	Stroke	Ratio of Stroke to Bore	Car	Bore	Stroke	Ratio of Stroke to Bore
Moline	4	6	1.50 to 1	Winton	$4\frac{7}{8}$	$5\frac{3}{4}$	1.11 to 1
Simplex	$4\frac{7}{8}$	$6\frac{1}{2}$	1.30 to 1	Garford	$4\frac{3}{4}$	$5\frac{1}{4}$	1.10 to 1
Thomas	$4\frac{1}{4}$	$5\frac{1}{2}$	1.30 to 1	Haynes	5	$5\frac{1}{2}$	1.10 to 1
Overland	$3\frac{1}{2}$	$4\frac{1}{2}$	1.29 to 1	Packard	5	$5\frac{1}{2}$	1.10 to 1
Pierce-Arrow	4	$5\frac{1}{8}$	1.28 to 1	Peerless	5	$5\frac{1}{2}$	1.10 to 1
Stoddard	$4\frac{1}{8}$	$5\frac{1}{4}$	1.27 to 1	Stoddard	5	$5\frac{1}{2}$	1.10 to 1
Packard	$4\frac{1}{16}$	$5\frac{1}{8}$	1.26 to 1	Lambert	$4\frac{1}{8}$	$4\frac{1}{2}$	1.09 to 1
Brush	4	5	1.25 to 1	Royal Tourist	$5\frac{1}{2}$	6	1.09 to 1
Pope-Hartford	$4\frac{5}{16}$	$5\frac{3}{8}$	1.25 to 1	Stearns	$5\frac{3}{8}$	$5\frac{7}{8}$	1.09 to 1
Pullman	$4\frac{1}{32}$	5	1.24 to 1	Alco	$5\frac{1}{8}$	$5\frac{1}{2}$	1.07 to 1
Pierce-Arrow	$4\frac{1}{2}$	$5\frac{1}{2}$	1.22 to 1	Buick	$4\frac{1}{4}$	$4\frac{1}{2}$	1.06 to 1
Alco	$3\frac{15}{16}$	$4\frac{3}{4}$	1.21 to 1	Marion	$4\frac{1}{4}$	$4\frac{1}{2}$	1.06 to 1
Chadwick	5	6	1.20 to 1	Overland	$4\frac{1}{4}$	$4\frac{1}{2}$	1.06 to 1
Hudson	$3\frac{3}{4}$	$4\frac{1}{2}$	1.20 to 1	Palmer-Singer	$4\frac{1}{4}$	$4\frac{1}{2}$	1.06 to 1
Jackson	$3\frac{3}{4}$	$4\frac{1}{2}$	1.20 to 1	Pullman	$4\frac{1}{2}$	$4\frac{3}{4}$	1.06 to 1
Oldsmobile	5	6	1.20 to 1	Regal	$4\frac{1}{2}$	$4\frac{1}{4}$	1.06 to 1
Overland	$3\frac{3}{4}$	$4\frac{1}{2}$	1.20 to 1	Columbia	$4\frac{1}{2}$	$4\frac{3}{4}$	1.05 to 1
Regal	$3\frac{3}{4}$	$4\frac{1}{2}$	1.20 to 1	Glide	$4\frac{3}{4}$	5	1.05 to 1
Everitt	4	$4\frac{3}{4}$	1.19 to 1	Kisselkar	$4\frac{1}{2}$	$4\frac{3}{4}$	1.05 to 1
Lozier	$4\frac{5}{8}$	$5\frac{1}{2}$	1.19 to 1	Moon	$4\frac{3}{4}$	5	1.05 to 1
Palmer-Singer	4	$4\frac{3}{4}$	1.19 to 1	Ohio	$4\frac{1}{2}$	$4\frac{3}{4}$	1.05 to 1
Franklin	$3\frac{3}{4}$	4	1.18 to 1	Pierce-Arrow	$5\frac{1}{4}$	$5\frac{1}{2}$	1.05 to 1
White	$4\frac{7}{8}$	$5\frac{3}{4}$	1.18 to 1	Rainier	5	$5\frac{1}{4}$	1.05 to 1
Case	$4\frac{1}{4}$	5	1.17 to 1	Selden	$4\frac{3}{4}$	5	1.05 to 1
Haynes	$4\frac{1}{4}$	5	1.17 to 1	Stoddard	$4\frac{3}{4}$	5	1.05 to 1
McIntyre	$4\frac{1}{2}$	$5\frac{1}{4}$	1.17 to 1	Hupmobile	$3\frac{3}{4}$	$3\frac{3}{8}$	1.04 to 1
Mitchell	$4\frac{1}{4}$	5	1.17 to 1	Flanders	$3\frac{3}{8}$	$3\frac{3}{4}$	1.03 to 1
Moon	$4\frac{1}{4}$	5	1.17 to 1	Stearns	$4\frac{1}{2}$	$4\frac{3}{8}$	1.03 to 1
S. G. V.	$3\frac{3}{4}$	$4\frac{3}{8}$	1.17 to 1	American	$5\frac{3}{8}$	$5\frac{1}{2}$	1.02 to 1
Alco	$4\frac{3}{4}$	$5\frac{1}{2}$	1.16 to 1	Autocar	$4\frac{3}{8}$	$4\frac{1}{2}$	1.02 to 1
Corbin	$4\frac{3}{4}$	$5\frac{1}{2}$	1.16 to 1	Jackson	$4\frac{3}{8}$	$4\frac{1}{2}$	1.02 to 1
Inter-State	$4\frac{3}{4}$	$5\frac{1}{2}$	1.16 to 1	Buick	4	4	1.00 to 1
Pope-Hartford	$4\frac{3}{4}$	$5\frac{1}{2}$	1.16 to 1	Buick	$3\frac{3}{4}$	$3\frac{3}{4}$	1.00 to 1
Premier	$4\frac{1}{2}$	$5\frac{1}{4}$	1.16 to 1	Cadillac	$4\frac{1}{2}$	$4\frac{1}{2}$	1.00 to 1
Peerless	4	$4\frac{3}{8}$	1.15 to 1	Cartercar	4	4	1.00 to 1
Pullman	$5\frac{1}{4}$	6	1.15 to 1	Cartercar	$4\frac{1}{2}$	$4\frac{1}{2}$	1.00 to 1
Dorris	$4\frac{3}{8}$	5	1.14 to 1	Franklin	$4\frac{1}{2}$	$4\frac{1}{2}$	1.00 to 1
Mercer	$4\frac{3}{8}$	5	1.14 to 1	Franklin	4	4	1.00 to 1
Columbia	$4\frac{7}{8}$	$5\frac{1}{4}$	1.13 to 1	Jackson	$4\frac{3}{4}$	$4\frac{3}{4}$	1.00 to 1
National	5	$5\frac{11}{16}$	1.13 to 1	Jackson	$4\frac{1}{2}$	$4\frac{1}{2}$	1.00 to 1
Palmer-Singer	$4\frac{7}{8}$	$5\frac{1}{2}$	1.13 to 1	Jackson	4	4	1.00 to 1
Reo	$3\frac{3}{4}$	$4\frac{1}{4}$	1.13 to 1	Kisselkar	$4\frac{1}{4}$	$4\frac{1}{4}$	1.00 to 1
Chalmers	4	$4\frac{1}{2}$	1.12 to 1	Locomobile	$4\frac{1}{2}$	$4\frac{1}{2}$	1.00 to 1
E. M. F.	4	$4\frac{1}{2}$	1.12 to 1	McIntyre	$4\frac{3}{4}$	$4\frac{3}{4}$	1.00 to 1
Hudson	4	$4\frac{1}{2}$	1.12 to 1	Maxwell	4	4	1.00 to 1
McIntyre	4	$4\frac{1}{2}$	1.12 to 1	Maxwell	$4\frac{1}{4}$	$4\frac{1}{4}$	1.00 to 1
Overland	4	$4\frac{1}{2}$	1.12 to 1	Oakland	4	4	1.00 to 1
Reo	4	$4\frac{1}{2}$	1.12 to 1	Oldsmobile	$4\frac{3}{4}$	$4\frac{3}{4}$	1.00 to 1
Sampson	4	$4\frac{1}{2}$	1.12 to 1	Simplex	$5\frac{3}{4}$	$5\frac{3}{4}$	1.00 to 1
Stevens-Duryea	$4\frac{1}{4}$	$4\frac{3}{4}$	1.12 to 1	Speedwell	5	5	1.00 to 1
Stoddard	4	$4\frac{1}{2}$	1.12 to 1	Thomas	$5\frac{1}{2}$	$5\frac{1}{2}$	1.00 to 1
Apperson	$4\frac{1}{2}$	5	1.11 to 1	Kisselkar	$4\frac{7}{8}$	$4\frac{3}{4}$	.97 to 1
Buick	$4\frac{1}{2}$	5	1.11 to 1	American	$5\frac{3}{4}$	$5\frac{1}{2}$	.95 to 1
Great Smith	$4\frac{1}{2}$	5	1.11 to 1	Chalmers	5	$4\frac{3}{4}$	.95 to 1
Inter-State	$4\frac{1}{2}$	5	1.11 to 1	Knox	5	$4\frac{3}{4}$	.95 to 1
Lambert	$4\frac{1}{2}$	5	1.11 to 1	Palmer-Singer	$5\frac{1}{2}$	$5\frac{1}{4}$	.95 to 1
Lozier	$5\frac{3}{8}$	6	1.11 to 1	Stevens-Duryea	$4\frac{3}{4}$	$4\frac{1}{2}$	.95 to 1
Marmon	$4\frac{1}{2}$	5	1.11 to 1	Corbin	$4\frac{1}{2}$	$4\frac{1}{4}$	.94 to 1
Matheson	$4\frac{1}{2}$	5	1.11 to 1	Simplex	$6\frac{1}{10}$	$5\frac{3}{4}$	.94 to 1
Oakland	$4\frac{1}{2}$	5	1.11 to 1	Apperson	$5\frac{1}{2}$	5	.91 to 1
Regal	$4\frac{1}{2}$	5	1.11 to 1				

5.75. The Apperson $5\frac{1}{2}$ by 5-inch motor is the greatest exponent of the short stroke in the whole Licensed ranks, its ratio being .91 to 1.

The Simplex with the next to the largest ratio has also the next to the smallest.

An analysis of the tabulation showing the ratio of stroke to bore will convey many points of interest to the student. The fact cannot be overlooked that on the first twenty or more names in the table the majority are concerns manufacturing large cars, cars which are specially suited for touring work, and cars which, with the exception of the Stoddard, Pope-Hartford, and Alco, have not figured extensively in the racing events of the present season. The cars which have been most prominent in speed events this year have a ratio between 1.11 to 1 and 1 to 1. This merely corroborates the old contention that for racing purposes the short stroke and large bore comprise the best combination. This theory, however, will appear to be upset by the report of the European racing situation, in which the long-stroke motor, namely with a ratio of 2 to 1, has carried off leading honors.

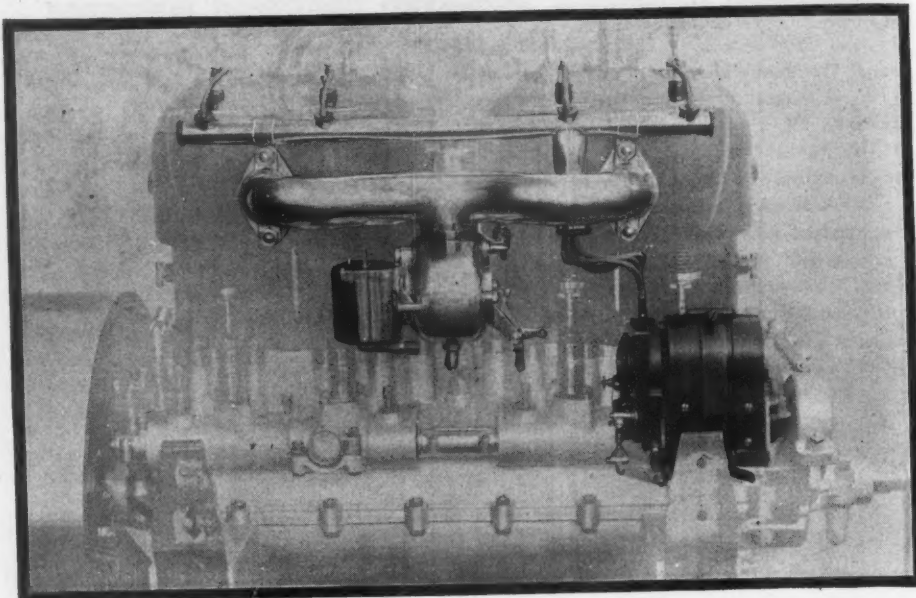


CYLINDER AVERAGE \$4,000 CAR

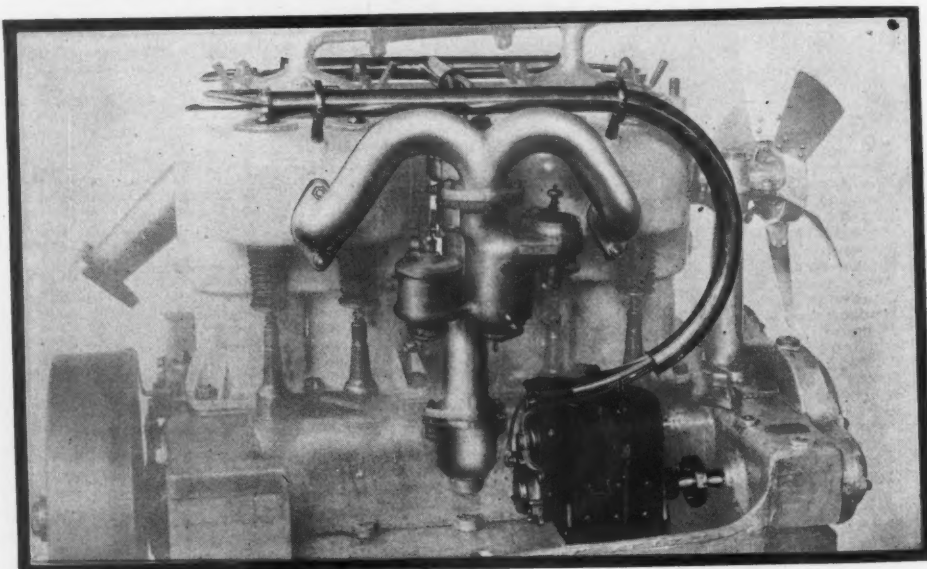
THERE are in the licensed association 188 different chassis and consequently the same number of different motors, so that in the following motor review reference is always made to this number. A review of the motor designs for 1911 can be taken as a fair criterion of the progress in the industry, because there is not a manufacturer but has in some way or other added refinements to his motor of last year. There are, it is true, many concerns that have improved the running gear of their cars more than the motor, but these improvements are recorded in other pages. In the following information on the motors the facts were obtained direct from the manufacturers, and so every figure applying to this year's trade is authentic. Where comparisons are made with the output of a year ago, some of the results are a little misleading, due to the fact that complete information is not at hand on last year's products.

The reader should bear in mind at the outset that 1 year ago, when the review of the motors made by the licensed association was printed in *Motor Age*, the number of manufacturers was approximately forty, whereas today the number is more than eighty, due to the landslide of practically all of the numbers of the American Motor Car Manufacturers' Association to the licensed ranks. This influx has to a large extent altered the phase of design, as exemplified in the licensed association, and when you review the motor statistics for the \$1,000 car, the \$1,500 car, the \$2,500 car, and the \$4,000 car, you will find some glaring irregularities, as compared with a year ago, and you will at first glance conclude that many of the numbers of the association have revolutionized the designs of their motors during the last year. As a matter of fact this is not the case, but, as already stated, the alteration has been due to the influx of outsiders into the association. Notwithstanding these facts, the present review will show the exact status of the licensed motor to date, and in the Chicago show issue we will review, in a similar manner, all of

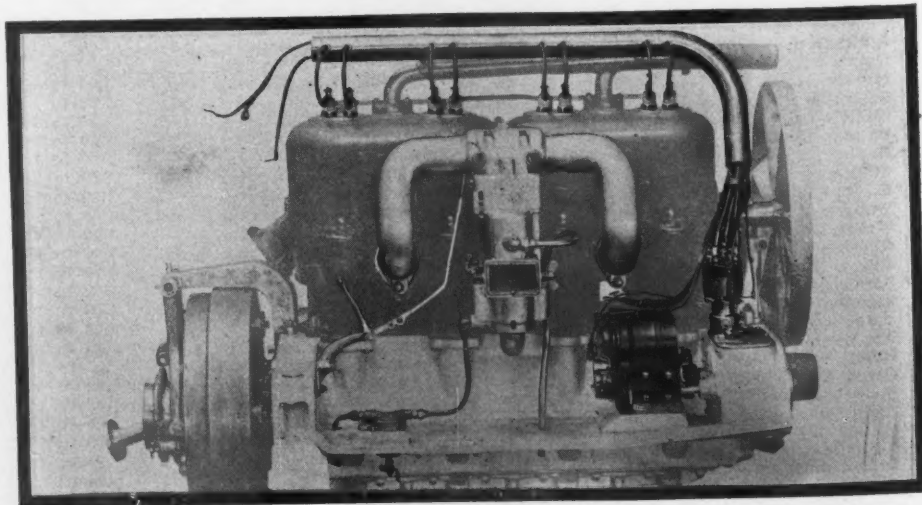
Motor Designs With the Magneto



THE 50-HORSEPOWER SIMPLEX HAS THE CARBURETER AND MAGNETO CARRIED ON THE SAME SIDE OF THE MOTOR



IN THE LOZIER FOUR THE CARBURETER IS CARRIED SPECIALLY HIGH, DUE TO THE PECULIARLY SHAPED MANIFOLD

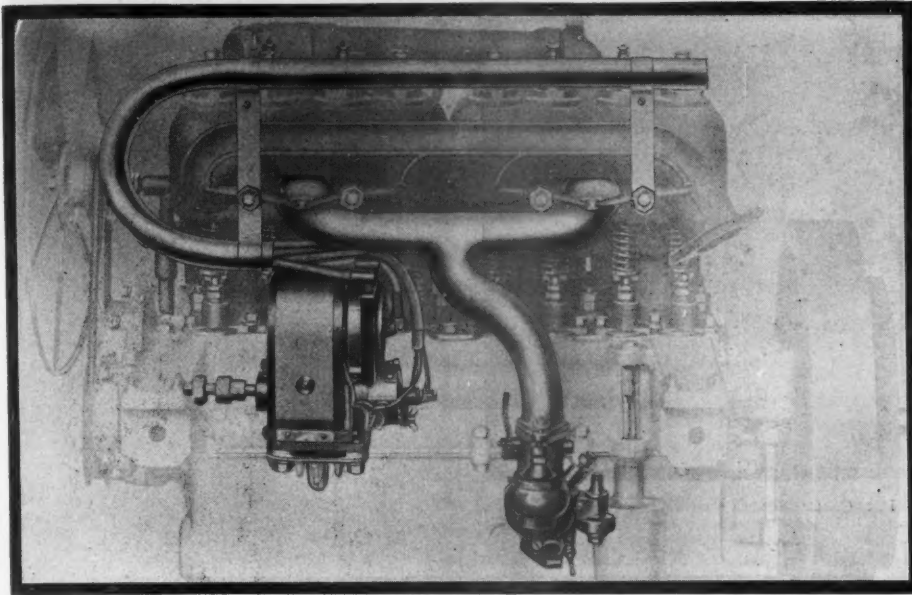


THE TWO-CYCLE AMPLEX USES A RAM'S HORN TYPE OF MANIFOLD AND CARRIES THE CARBURETER VERY HIGH UP

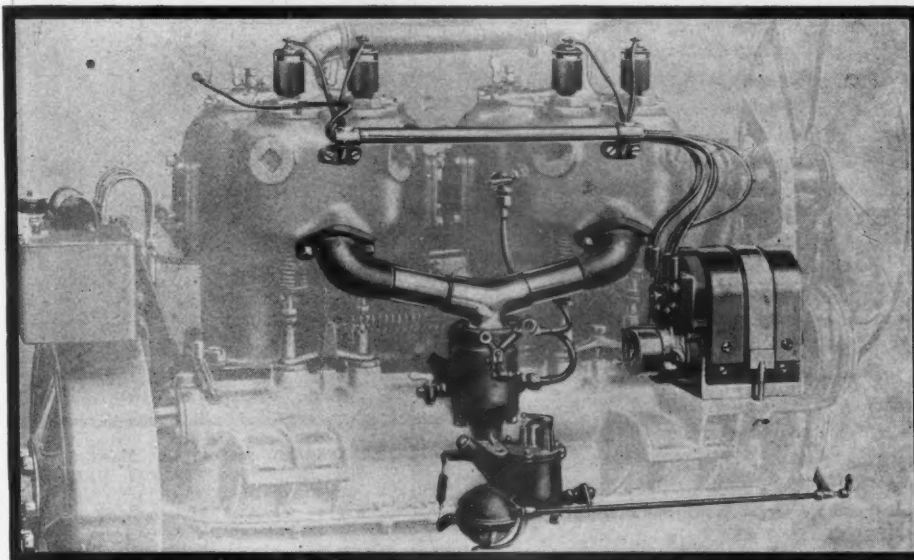
THE three motor illustrations on this page, three on the following page and also those of the four-cylinder Locomobile, and the four-cylinder Pierce-Arrow used in commercial cars on pages 46 and 47 show one striking similarity in motor design, namely, the carrying of the magneto and carburetor on the same side of the motor. There is, however, considerable diversity of form in these motors, some locating the magneto at the forward end like the Simplex, Lozier, Ampex, Peerless, Garford and Locomobile, whereas others mount the magneto at the rear end. It is customary where the water pump and magneto are on the same side to mount the magneto at the rear, as is the case on such motors as Selden, Marmon, Case, Inter-State, Speedwell, National and many others seen on pages 48 and 49. There are advantages pro and con in the matter of locating the magneto at the front end of the motor or at the rear. When located

(Continued on next page)

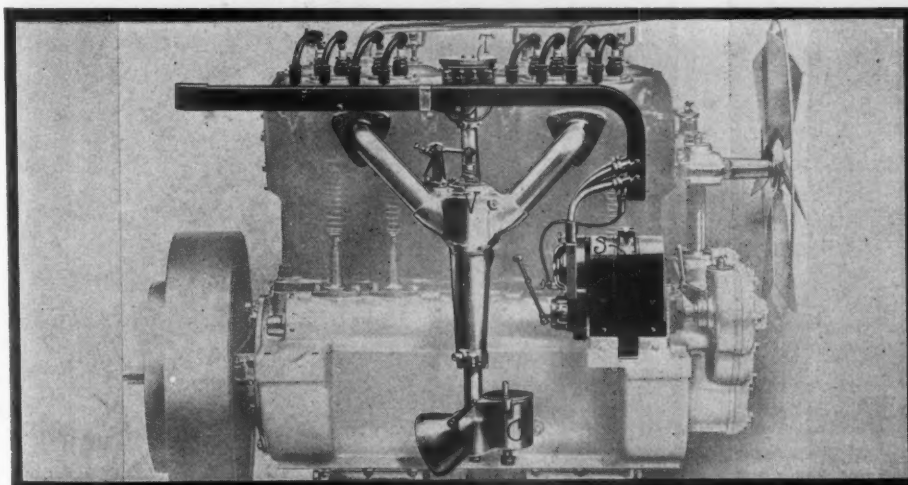
and Carbureter on the Same Side



THE REGAL USES GRAVITY GASOLINE FEED AND ACCORDINGLY PLACES THE CARBURETOR LOW. THE MAGNETO WIRING IS COMPACT



THE GARFORD 40 USES A TYPICAL Y MANIFOLD AND NEAR IT IS A BOSCH LOW-TENSION MAGNETO. MAGNETIC PLUGS ARE USED



THE PEERLESS FOUR HAS BEEN A LEADER IN THE ENCLOSING OF IGNITION CABLES AND NEAT, WATERJACKETED INTAKE.

the motors built by concerns not in the ranks of the association.

Of the total 188 varieties of licensed motors for 1911, the aggregate horsepower is 6,658.7, which gives an average horsepower of 36.2, formula rating. This motor, by actual average, has a bore of 4.5 inches and a stroke of 4.78. These sizes typify the licensed construction for 1911. In a word, this motor leans to the long stroke, which measures a little over $\frac{1}{4}$ -inch in excess of the bore. We did not have the average size of the licensed motor for last year, but undoubtedly it was of higher horsepower than this, because many of the new concerns which have joined the association use medium-powered motors and so have slightly reduced the average.

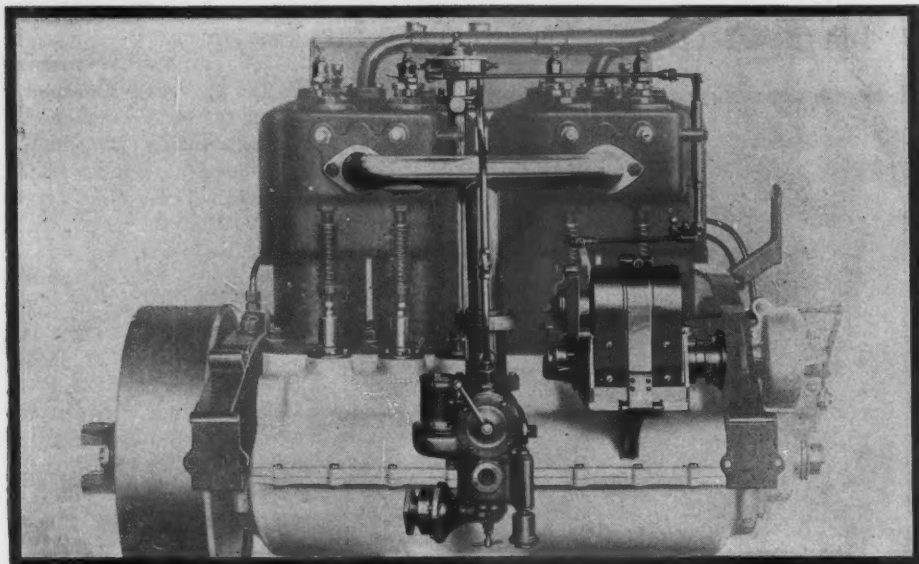
Before going into detail on the different types of motors a few general conclusions from statistics will show the status of the situation. Of the 188 motor types the divisions as to number of cylinders is as follows:

Licensed four-cylinder motors.....	152
Licensed six-cylinder motors.....	32
Licensed three-cylinder motors.....	2
Licensed one-cylinder motors.....	1

The four-cylinder still remains as the great leader in the motor type. The six-cylinder design has gained during the year, the Locomobile having for the first time brought out a motor of this type, and the Pope-Hartford has recently announced a six also, which will be exhibited at the show. Those concerns that have been building sixes during the past year are continuing them, and there seems a new confidence in the six-cylinder design. Pierce, Winton and Chadwick build nothing else but sixes, and all of the other concerns which last year included a six in their list have announced a greater output of sixes for this year. The progress of the six is very gradual, but it is gaining and three or four concerns, which have had six-cylinder types on the market but have withdrawn them, are at present working on new six-cylinder models, which they hope to market by July 1. The unmistakable conclusion from the whole six-cylinder situation is that there is a growing

at the front a leather boot is an essential in order to prevent water splashing through the radiator causing short circuits. Where the magneto is located on the rear of the crankcase this danger is eliminated. Locating the magneto on the rear generally results in a reduction of the length of the wiring, particularly in the case of a system which combines a coil on the dash. There is every tendency to reduce the wiring system and this means has been adopted by some concerns.

Many concerns are averse to carrying the magneto on the same side of the motor as the carburetor on the ground that if the magneto is located close to the carburetor there may be danger of a short-circuit spark in the magneto igniting the gaseous mixture around the carburetor. This has happened on a few occasions. With the improved coverings furnished for magnetos this danger is, however, to a large extent eliminated and the danger removed.



THE FOUR-CYLINDER PIERCE-ARROW MOTOR USED IN ITS COMMERCIAL CARS HAS THE MAGNETO AND CARBURETER LOCATED ON THE SAME SIDE. THE CARBURETER IS LOCATED LOW DOWN FOR GRAVITY GASOLINE FEED AND IS CONNECTED TO A T-SHAPED MANIFOLD

demand for this type of motor in the higher-powered cars.

With the story of the status of the four and six-cylinder motor the motor review is practically completed, so far as the number of cylinders is concerned. There are but two chassis with a three-cylinder motor and one with a single cylinder.

There has been progress made during the year pointing toward the ultimate standardization in the matter of casting the cylinders. Up to the present there has been great diversity as to whether they should be cast in pairs, separately, in threes, or in one block. Of the 188 motor types the division is as follows:

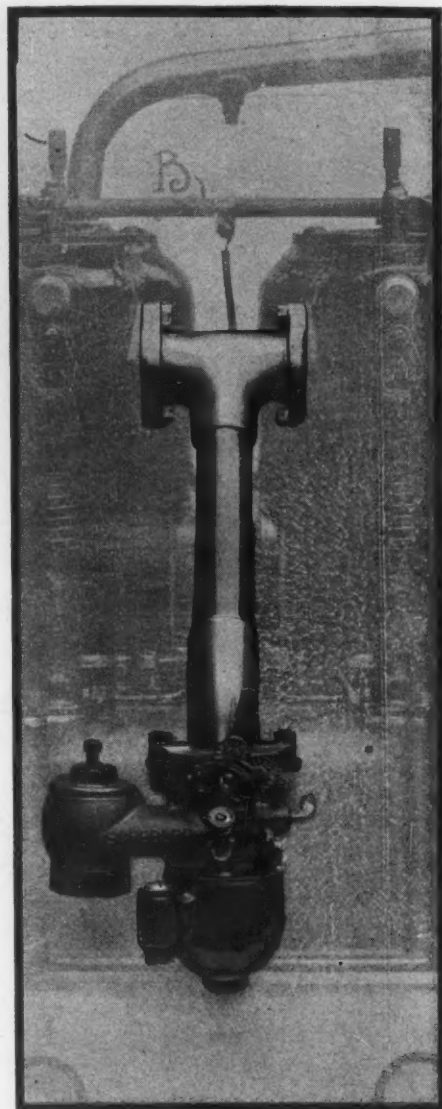
Cylinders cast in pairs.....	131
Cylinders cast separately.....	36
Cylinders cast en bloc.....	20
Cylinders cast in threes.....	1

Casting in pairs has gained during the year, there being upwards of half a dozen concerns which heretofore used the individual casting but have now thrown in

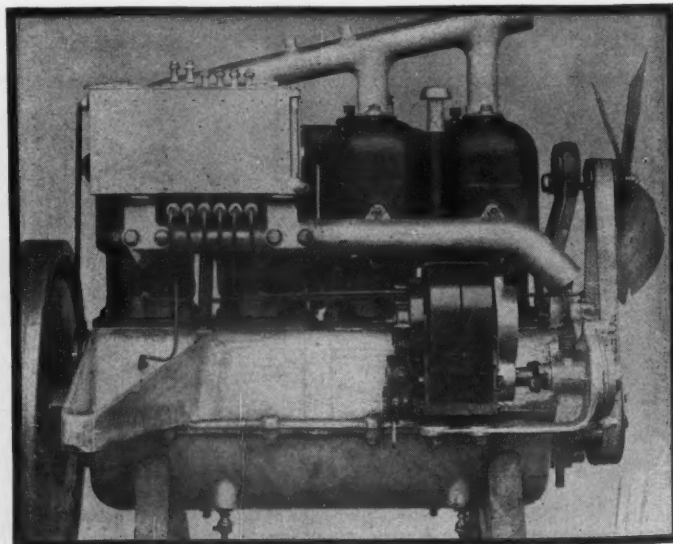
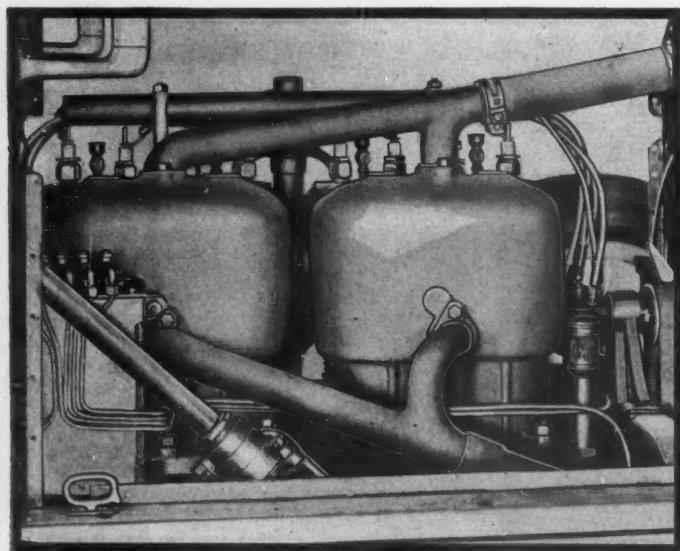
their lot with the twin casting group. Those concerns that clung to the separately-cast cylinder because it allowed of fitting five crankshaft bearings in a four-cylinder motor, have had, in spite of using the twin castings, continued the five-bearing crankshafts by using three mainbearings of extra length and two shorter ones between the cylinders constituting a pair. There has not been much gain in the en bloc casting, not so much as was expected. This is practically due to the few en bloc types of motors that have been marketed, the majority of the new concerns entering the field using cylinders cast in pairs.

It was expected 1 year ago that the thermo-syphon water circulation would be a big gainer, but the looked-for increase has not materialized, this again being explained to a certain extent by the fact that quite a few concerns have considered their 1910 cooling facilities adequate. In some cases the continuance of the pump circulation has been due directly to the

Simplified Intake Pipes

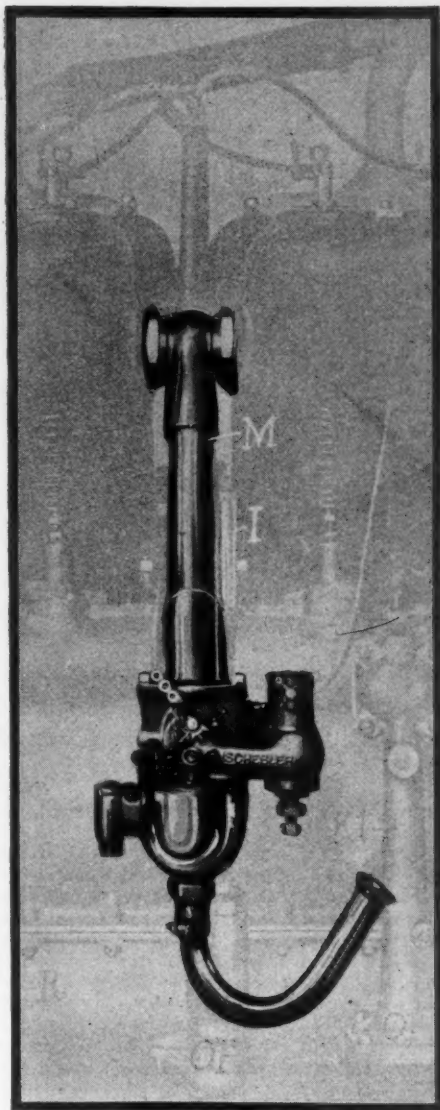


THE PREMIER FOUR-CYLINDER MANIFOLD IS HERE ILLUSTRATED. IT IS A T UNION BETWEEN THE TWIN CASTINGS, THE CASTINGS BEING CORED TO FORM THE REST OF THE SYSTEM. THIS AVOIDS CONDENSATION OF THE MIXTURE

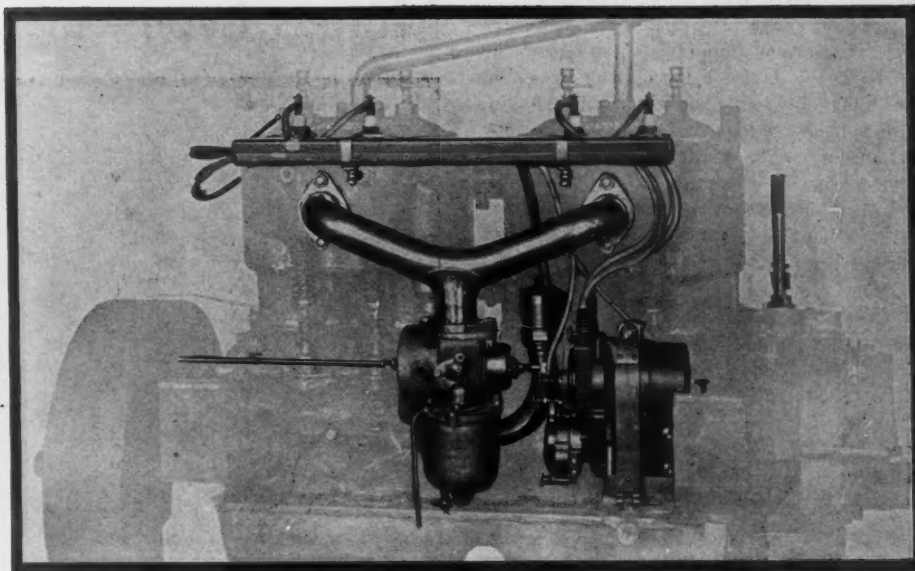


TWO LEADING EXAMPLES OF THERMO-SYPHON COOLING ARE SHOWN HERE, THE MOLINE ON THE LEFT, THE OVERLAND ON THE RIGHT. THE MOLINE MOTOR HAS THE DISTINCTION OF BEING THE LONGEST STROKE ONE IN THE LICENSED RANKS. THE OVERLAND IS ONE CONCERN THAT REMAINS FIRM WITH SEPARATELY CAST CYLINDERS

Gaining Each Season



THREE YEARS AGO THE MARMON INTRODUCED THIS SIMPLIFIED FORM OF INTAKE MANIFOLD, WHICH IS BUT A STRAIGHT TUBE WITH A T HEAD BETWEEN THE CYLINDER CASTINGS. THIS FORM OF MANIFOLD LEAVES THE INTAKE VALVE SPRINGS MOST ACCESSIBLE



THE LOCOMOBILE FOUR-CYLINDER IS NOW FITTED WITH HIGH-TENSION IGNITION AND THE HIGH-TENSION CABLES ARE CARRIED WITHIN A COMPACT RECTANGULAR TUBING. THE NEW CARBURETOR WITH DASH CONTROL FOR THE AUXILIARY AIR VALVE IS CLOSE TO THE MAGNETO

fact that several concerns reduced their 1910 output before the end of the year, and several of their 1910 motors are being slightly altered to constitute 1911 models.

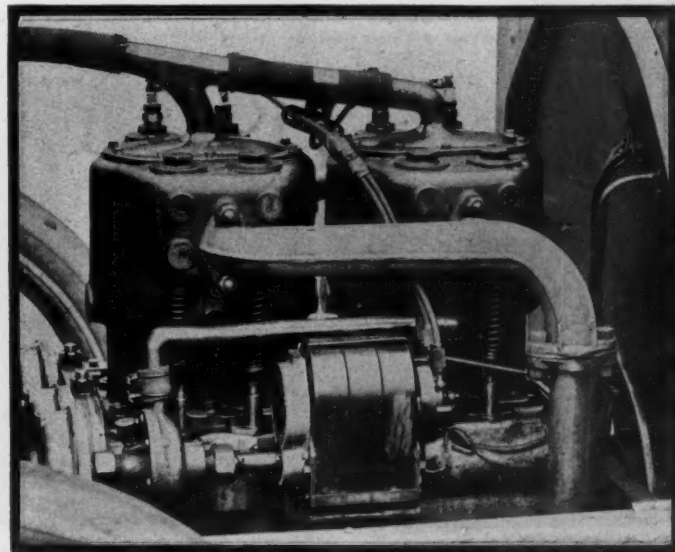
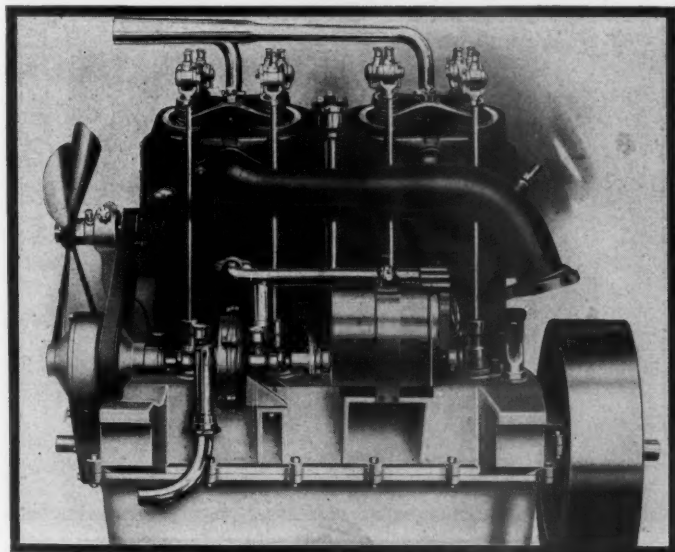
Water cooling remains the big leader, there being 182 water-cooled machines out of the 188, the Franklin company still continuing as the leading air-cooled exponent. The exact figures governing the cooling are as follows:

Water pump circulation.....	156
Thermo-syphon circulation	26
Air cooling	6

Unquestionably more activity has been shown in the general subject of ignition than in any other motor detail. There is scarcely a concern but has made some progress in the ignition field, and these changes are so diverse as to make classification impossible. A few examples will show the general system, some concerns that used double ignition last year are using dual this season, and others that used the dual last year have returned to

the double. There has, however, been a wonderful movement towards double ignition in the \$2,500 car, by this being meant the car that sells from \$2,000 to \$3,000. The undoubted reason for the landslide towards double ignition in this class is that the makers have put the two systems on as a talking point to compete with the cars selling from \$3,000 and up. Last year double ignition led in cars listing about \$3,000, and this undoubtedly was the tip that many of the \$2,500 makers took in adding double ignition. It is somewhat humorous to note that this year the double ignition system in high-priced cars has dropped, as compared with a year ago, so that we may look for a \$2,500 maker changing his plans a year hence, if he will still continue to use the ignition equipment as one of his selling arguments when competing with a higher-priced car.

Four exponents of low-tension ignition have either dropped this system direct

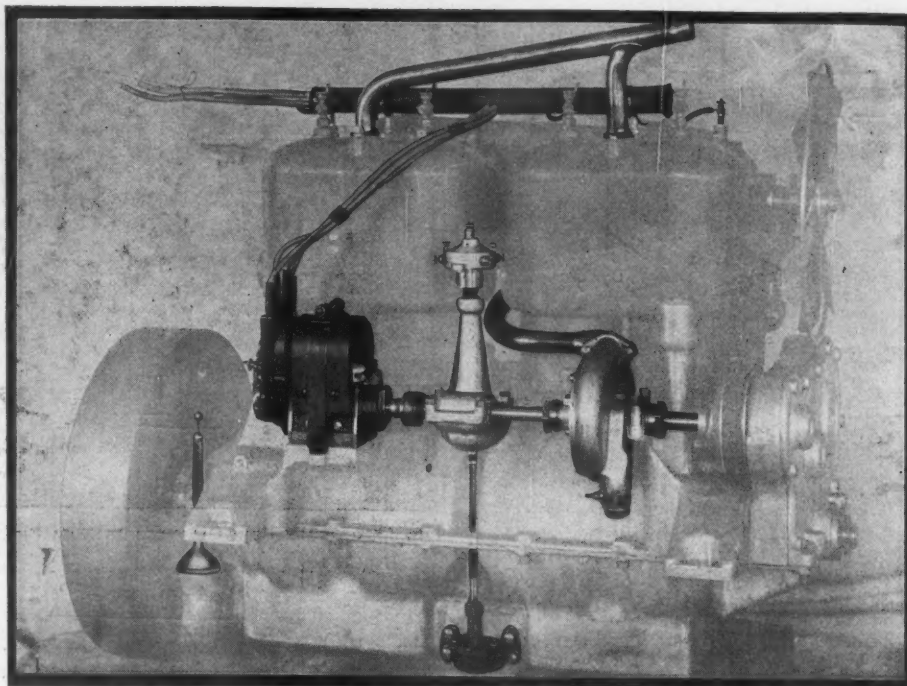


THE STODDARD-DAYTON MOTOR CONTINUES AS A LEADING EXAMPLE OF THE VALVE-IN-THE-HEAD TYPE, BUT THE EXTERNAL SPRINGS ARE NOW REMOVED FROM THE TAPPET RODS. THE MOON 30, MOTOR ILLUSTRATED ON THE RIGHT HALF OF THIS PAGE, IS ONE EXAMPLE OF DESIGN IN WHICH THE MAGNETO AND CARBURETOR ARE ON OPPOSITE SIDES

or compromised with a high-tension system. These four exponents are Locomobile, Matheson, Premier and Columbia. The Locomobile uses a double high-tension ignition system on its four and six-cylinder models having dropped the low-tension entirely. On its four-cylinder type the Matheson has offered the high-tension as an option. The Premier fits the high-tension system on its four and six-cylinder models. The Columbia uses high-tension on both models.

From a viewpoint of general design the student of motors cannot but note the numerous refinements that are shown in so many of the motors. Concerns that have not changed the bore and stroke for 2 or 3 years and have changed little in their general scheme of construction are showing motors this year which are cleaner in appearance than ever before. The days when the high-tension cables straggled all over the cylinder heads and around the manifolds are over and today they are safely enclosed in a polished metal tube or a neat fiber one. In the case of the Alco three metal tubes placed side by side on the right of the motor are used to care for the ignition wires; the Packard has fitted a compact brass tube to convey the leads from the magneto to the plugs; the Pierce has improved its motors with a rectangular tube carried over the water return pipe, and from the sides of which exit the wires to the plugs; the Peerless, which was a leader in the matter of enclosing its cables, continues its present neat system; the Locomobile, on its four and six-cylinder cars, which are fitted for the first time with high-tension ignition, has a specially compact cable-carrying tube; the Chalmers 40 has dropped from double to dual ignition, with a corresponding simplification of the wire problem; the Premier, heretofore an exponent of low-tension ignition, fits a high-tension system, but gives an option of low-tension

Motor Types in Which Ignition and

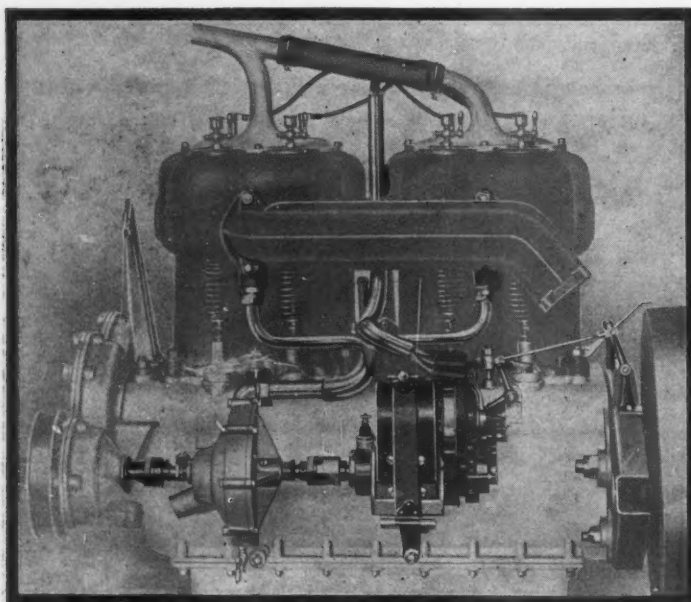


THE SELDEN IGNITION, COOLING AND OILING FEATURES ARE SHOWN HERE. THE GEAR OIL PUMP AND TIMER ARE ON A VERTICAL SHAFT IN THE CENTER OF THE MOTOR. THE MAGNETO IS PLACED WELL TO THE REAR AND BACK OF IT IS AN OIL INDICATOR TO SHOW THE LEVEL IN THE CRANKCASE

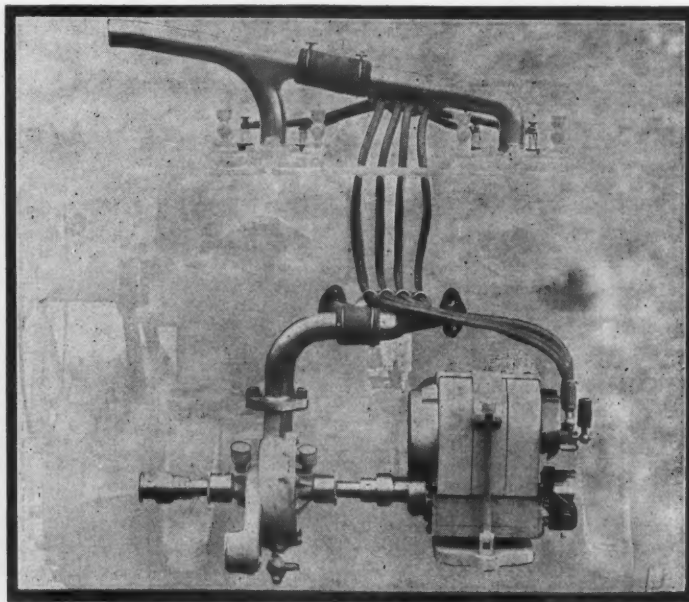


ON this and on the following page are given six typical illustrations of motors in which the magneto and water pump are grouped on the same side, and the fact cannot be overlooked that in every case the magneto is located to the rear, generally on the left or right rear motor leg as the case may be. The protection afforded it from water at this position cannot be overlooked. It has become general practice in motors of this design to place a jaw coupling on either side of the water pump, so that the magneto can be removed without molesting the pump or if desired the pump can be taken out entirely without unseating the magneto. Some makes have increased the rigidity of the pump by placing a bearing on each side of it.

Two or three characteristics in the water circulation system are shown in this group of motors. In the National the cold water enters the cylinder head immediately above the exhaust valve. The return water pipe to the radiator leaves the jacket heads at the opposite side, a positive circulation throughout the jacket is insured by partition. In the Marmon the water enters the jackets beneath the exhaust valves, it being customary to have the

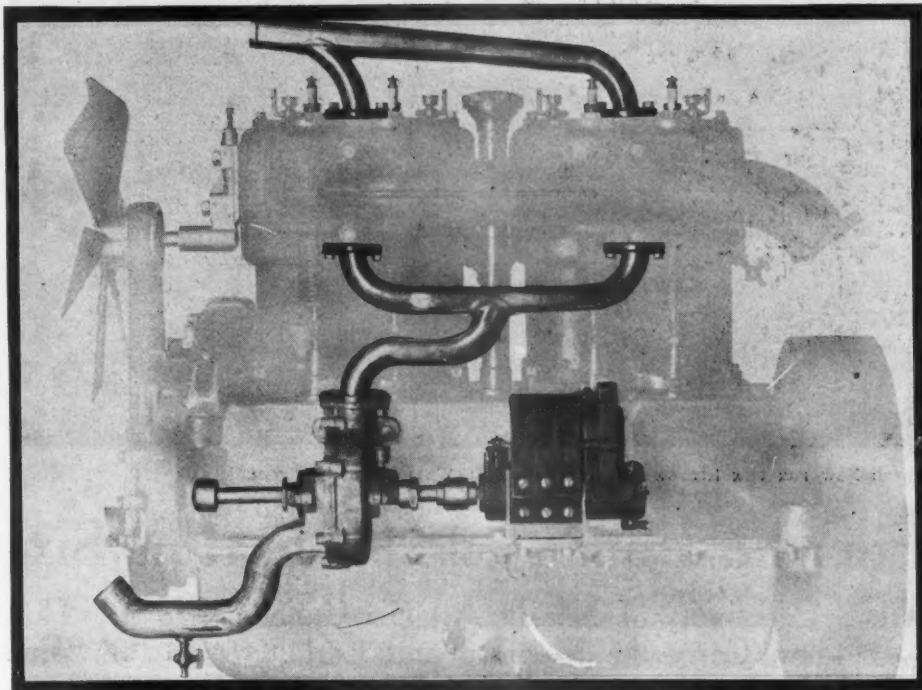


THE MARMON 32 MOTOR CARRIES THE EXHAUST MANIFOLD HIGH AND THE WATER PIPES LOW, LEAVING THE EXHAUST VALVE SPRINGS VERY ACCESSIBLE. THE MAGNETO WIRES ARE WELL PROTECTED FROM THE EXHAUST MANIFOLD



THE CASE IS A GOOD EXAMPLE OF THE ABBREVIATED WATER PIPES, THE INTAKE PIPES ENTERING AT THE CORNERS OF THE EXHAUST VALVE CAGES, INSTEAD OF IN THE CENTERS OF THEM. THE MAGNETO WIRES ARE NOT ENCLOSED BUT ARE WELL SUPPORTED

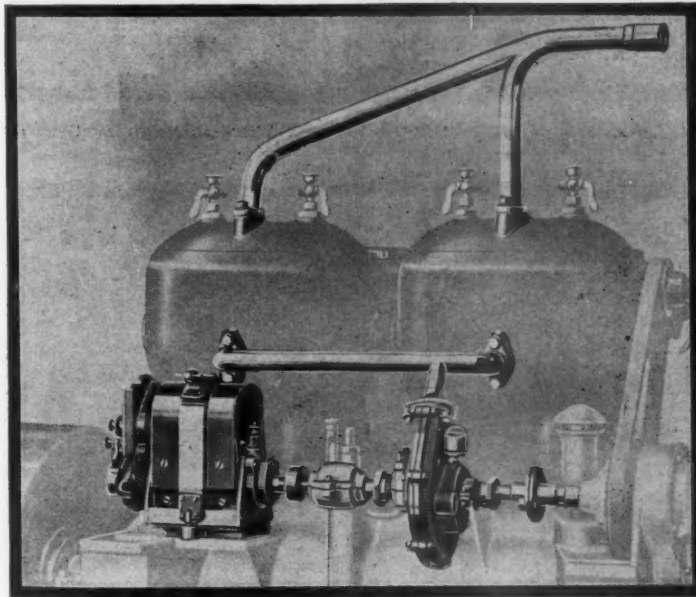
Water System Parts Are Grouped



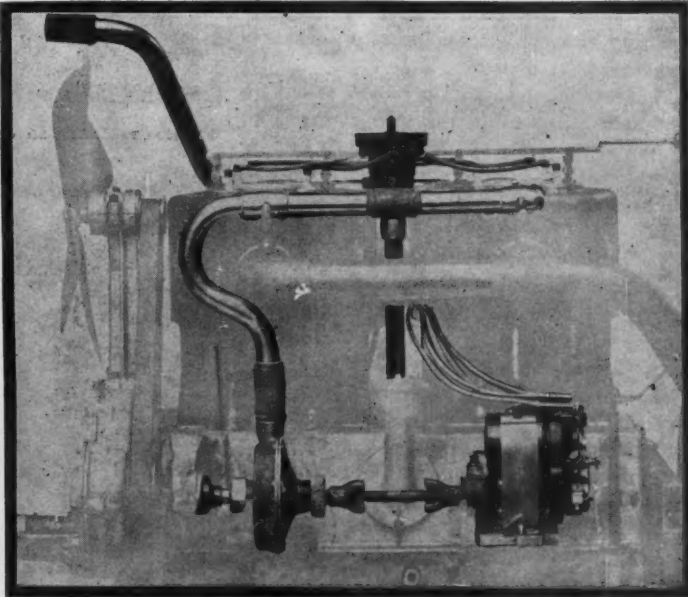
THE NEW 50-HORSEPOWER INTER-STATE MOTOR IS AN EXAMPLE OF THAT DESIGN IN WHICH THE MAGNETO AND WATER PUMP ARE GROUPED ON ONE SIDE, WITH THE CARBURETOR OPPOSITE. THE EXHAUST VALVE SPRINGS ARE VERY ACCESSIBLE. THE DRAIN COCK IN THE WATER PIPE SHOULD BE NOTED

water lead into the jackets at this point because these valves have to be kept cool. On the Selden, in which the intake and exhaust valves are on the left side, the water pipe is carried between the twin castings in order to conduct the water into the jacket adjacent to the valve cages. The Speedwell is an example of that motor using an L-type casting in which the water enters the jackets at the side opposite to the valves.

The many improvements made in the lubricating system of motors include the float well in the crankcase, in which is a cork float analogous to the float in the carburetor. This float carries a long stem which generally rises in a glass tube on the top of the crankcase. The top of the stem carries an indicator which shows the oil level. Last year many of these glass gauges were low down on the side of the crankcase, making it necessary to light a match and hold it close to the gauge in order to see the oil level. This was a dangerous practice, but has been entirely eliminated by the gauge being well elevated. The position of the gauge may be seen in the Selden motor illustration between the crankcase and the flywheel. This gauge has become a standard part of a great many motors.



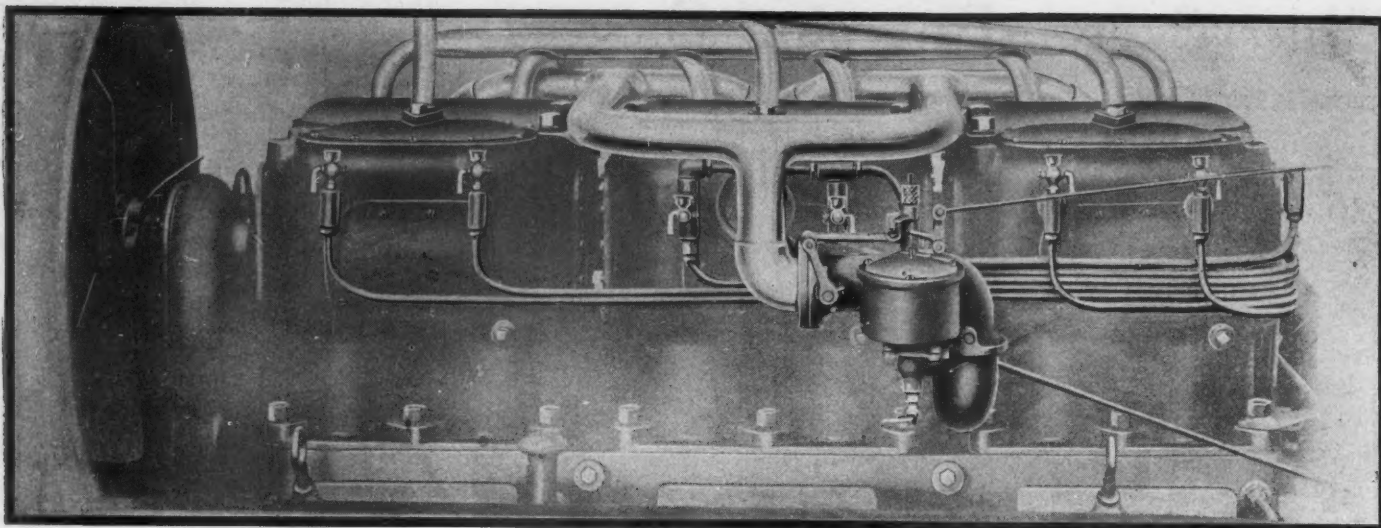
ON THE 1911 SPEEDWELL A BEARING HAS BEEN PLACED IN FRONT OF THE CENTRIFUGAL WATER PUMP, SO THAT THERE IS NOW A BEARING ON EACH SIDE OF IT. THERE IS ALSO A JAW COUPLING ON EACH SIDE, SO THAT THE PUMP CAN BE SEPARATELY REMOVED



THE NATIONAL MOTOR CONTINUES TO USE A DISTRIBUTOR IN ITS DOUBLE IGNITION SYSTEM, THE MAGNETO WIRES PASSING BETWEEN THE CYLINDER CASTINGS AS ILLUSTRATED. THE INTAKE WATER ENTERS THE TOP OF THE JACKETS AT THE LEFT HAND SIDE

where desired; and so the story of ignition simplification continues. The Bosch company has aided materially in this work by the manufacture of its horizontal dash coil used in the dual system. This coil is now carried through the dash, so that all that can be seen from the driver's seat is the circular end containing the switch parts. On the Hudson an attempt at waterproofing the ignition system is shown by a rubber sleeve extending from the Bosch coil to the fiber tube carrying the wires to the plugs. The Cadillac uses a double system, made up of a magneto outfit and the Delco system. The Elmore two-cycle cars are now fitted with a magneto in addition to the Atwater-Kent outfit.

The circulating system of oiling has steadily gained during the year, by circulating being meant that system in which the oil is used over and over again, one filling of the reservoir in the motor base serving for 500 to 800 miles. The Locomobile has fitted this in its new six-cylinder car; the Premier has adopted it on its four and six-cylinder models; it is fitted on the four-cylinder Mitchell types; the Kisselcars are so equipped; this change is made on the Dorris motor; the Corbin has added it, and the list of concerns could be extended. One noticeable change in circulating systems is the reduction in the amount of oil being used, which is made possible by not having the big lower end of the connecting rod dip into the oil level in the crankcase base, but by putting small spoons or scoops onto the connecting rod caps, and having the spoon dip into a small trough not 1 inch wide and a little more than $\frac{1}{2}$ inch deep. By this construction the amount of oil that is being churned up is greatly reduced. With the ordinary splash system there has frequently been the criticism that with slow motor speeds the splash

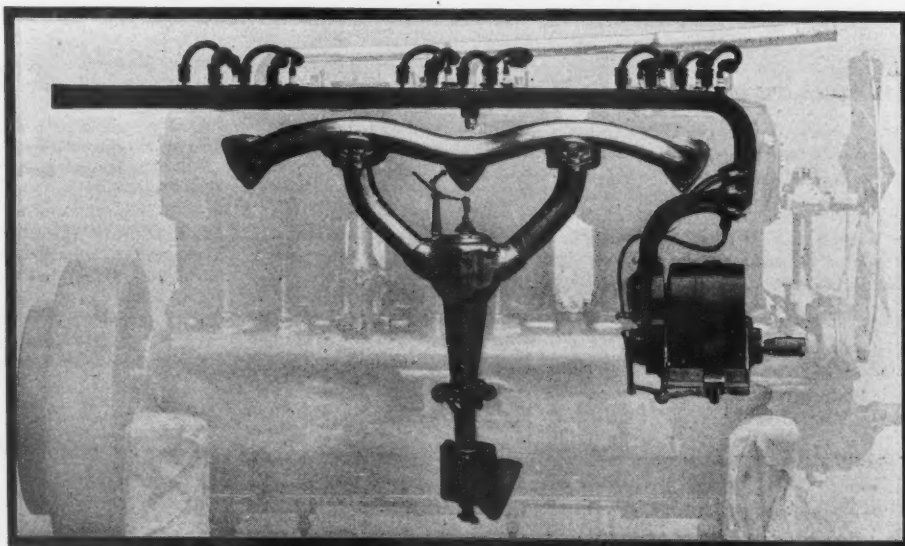


THE WINTON SIX USES BRASS TUBING NOW FOR THE INTAKE MANIFOLD AND ALL WATER PIPES ON THE MOTOR

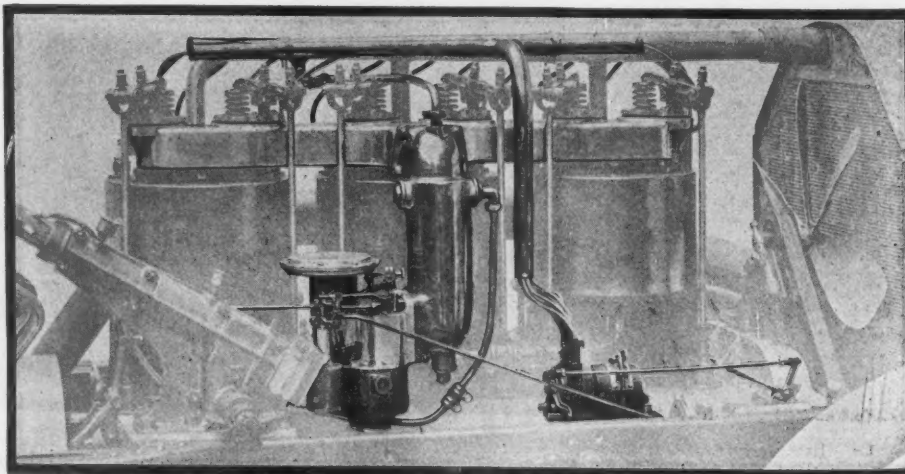
was greatest, due to the fact that at high motor speeds, when the connecting rod cuts its way through the oil, there was not time for the oil to close together again before the connecting rod completed another revolution, so that with the highest motor speeds there was in reality not so much oil splashed as the speed of the crankshaft would lead a person to expect. This condition answers the question why so many motors in races have seized and broken a connecting rod or torn a cylinder casting apart, due to lack of oil. This difficulty is overcome in the trough system, because there is a constant stream being poured into the trough from the oiler, and the faster the motor works the faster the oil is pumped, and so the supply in the trough is kept up to its level. These troughs are used in the new Locomobile six and a larger sized one in the Premier system. It is a healthy indication to note, however, that many concerns which have used the circulating system last year have this year improved it by the addition of the scoop or spoon to the connecting rod cap, which greatly conserves the lubricant qualities.

Those concerns that have not relied on the splash system in the past continue to follow this course. The leader of this system is the Pierce, which has been the pioneer in America in the circulating system. The Pierce motor has not used a splash oiling system for several years, the cylinders being lubricated by the throw off of oil from the lower connecting rod bearings, which oil is forced to these bearings through the drilled crankshaft. The new four-cylinder Corbin also uses the no-splash system. Manufacturers are beginning to realize that they get too much oil at times and not enough at other times, so that the real problem becomes that of getting just enough and no more whenever needed. It would seem that some concerns strive to get as little as possible, whereas others aim at getting as much as possible. If the smoke regulations were looked after as stringently in American cities as they are in Paris there would

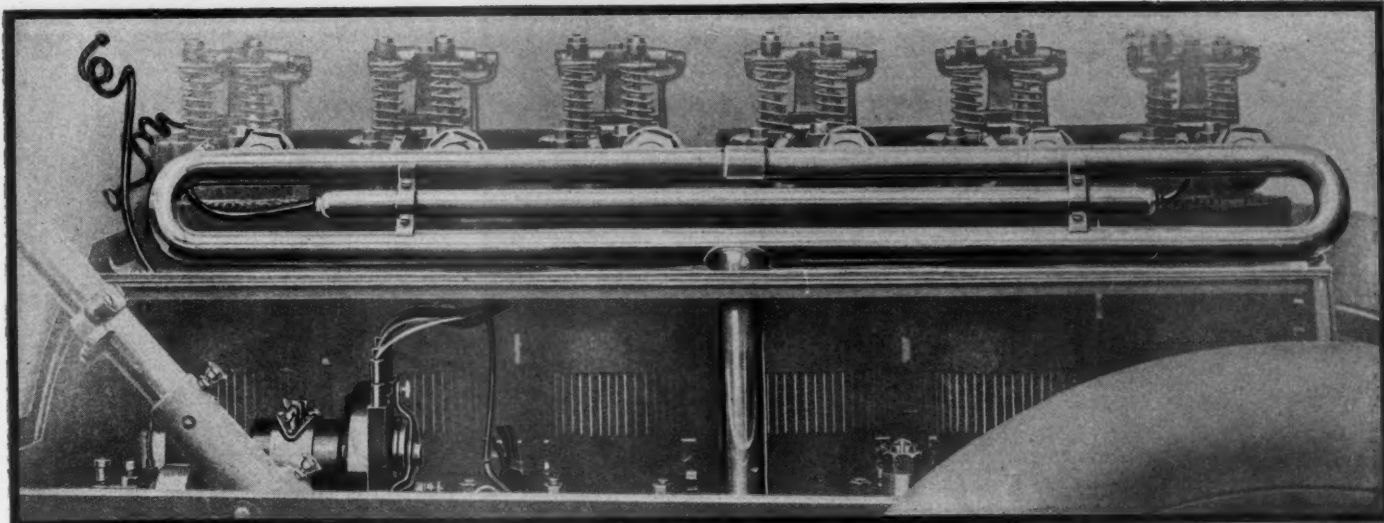
For the Coming 1911 Season Six-
It Is a Peculiarity of Nearly All Six-Cylinder Motors, That They Carry the Magneto and Carbureter on the Same Side and Locate the Carbureter at the Forward End.



COMPACT MANIFOLD ON PEERLESS SIX AND NEAT DOUBLE IGNITION WIRING SYSTEM AS USED ON THE FOUR-CYLINDER CARS



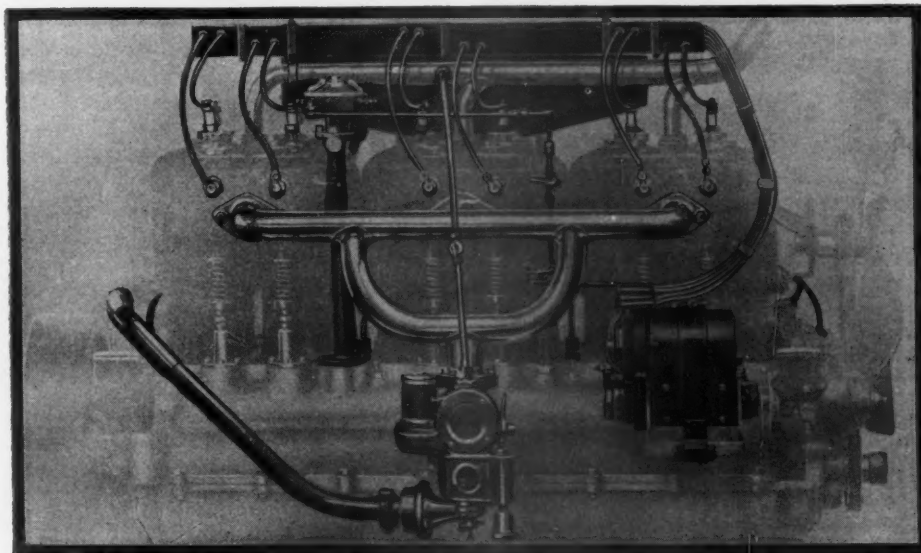
THE CHADWICK SIX USES A T-TYPE OF INTAKE MANIFOLD



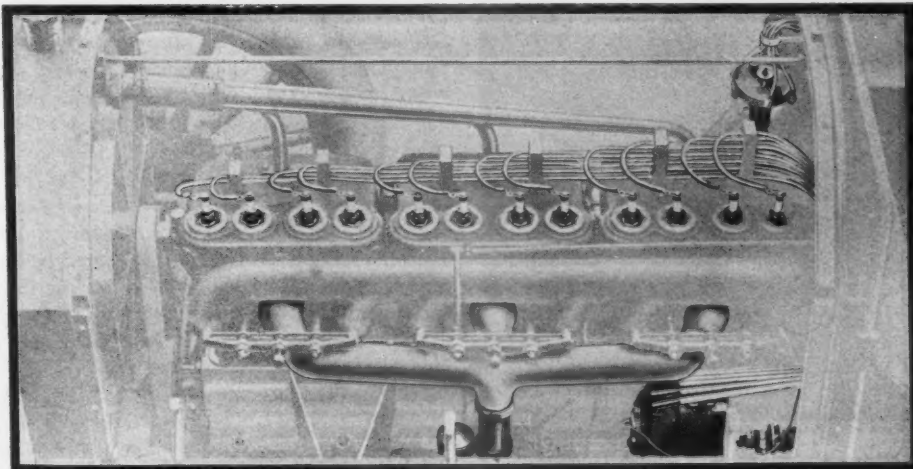
THE AIR-COOLED FRANKLIN SIX USES A TROMBONE-SHAPED INTAKE PIPE

Cylinder Motors Show Some Gains

On the Franklin, the Magneto Is Placed at the Rear. The Stevens-Duryea Also Places the Magneto at the Back End of the Motor Where It Is the Most Accessible



DOUBLE OR LOOP MANIFOLD USED ON PIERCE MOTORS, WITH HOT AIR INTAKE FROM THE EXHAUST MANIFOLD UNDER THE FLOOR BOARDS



ON THE STEVENS-DURYEA A T-DESIGN OF INTAKE IS USED

be more concerns devote greater attention to getting the oil in the right place, in the right quantity, and at the right time.

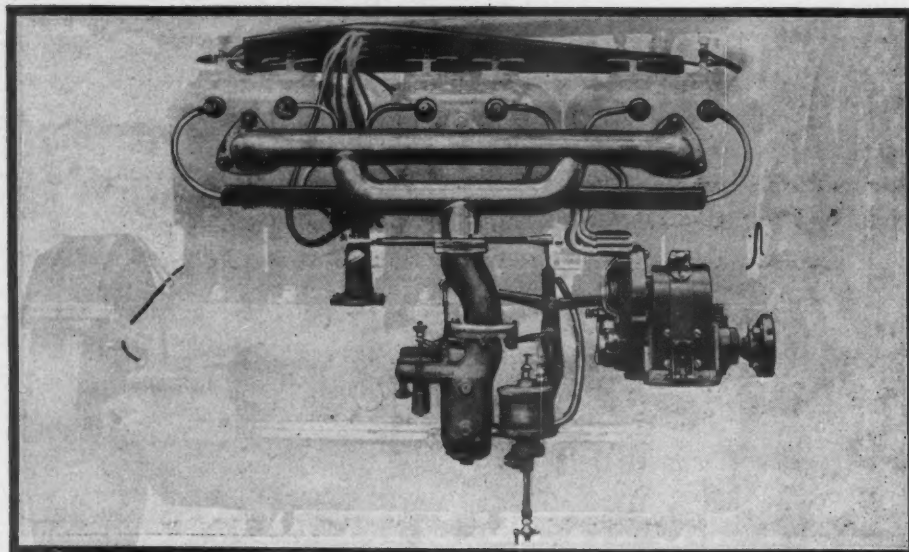
But the improvements in the lubrication are not solely confined to adopting the circulating system, there having been many changes in the accessibility of the different parts. Heretofore breather pipes, which have been used as funnels through which to pour oil into the crankcase, have ranged from three-quarter to 1¼-inch internal diameter. It has frequently been difficult to pour oil into them without spilling it over the crankcase. Now many concerns have inserted a funnel-shaped oil filler on the side of the crankcase so that the sloping regime is over. The Mitchell has done this, placing the filler on the motor arm; the National has improved its motors with a large-sized filler on the center of the crankcase; and others are following these examples. There has been an improvement in the design of filler caps.

THE \$1,000-CAR'S MOTOR

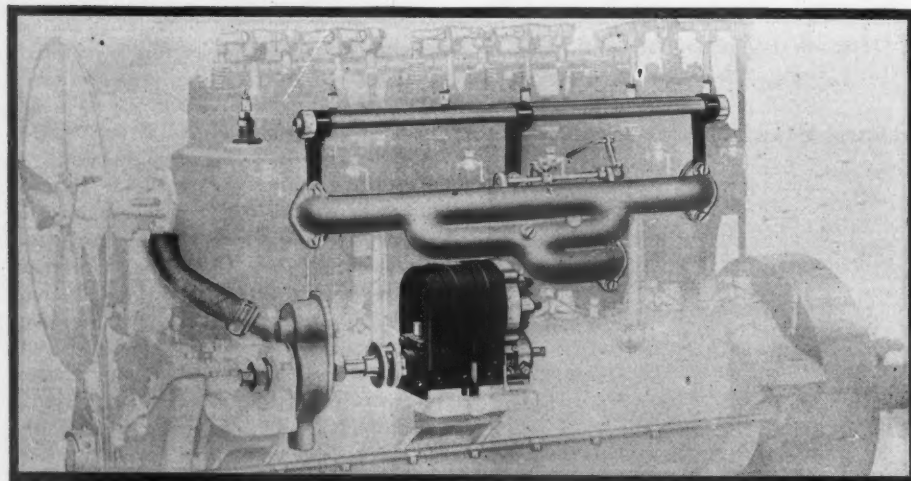
As published last year, Motor Age again publishes this year the motor details of the four leading motor types in the licensed association. For convenience the four car classes which are typical of the industry are as follows:

\$1,000 car.....	\$1	to \$1,250
1,500 car.....	1,250	to 2,000
2,500 car.....	2,000	to 3,000
4,000 car.....	3,000	to 7,500

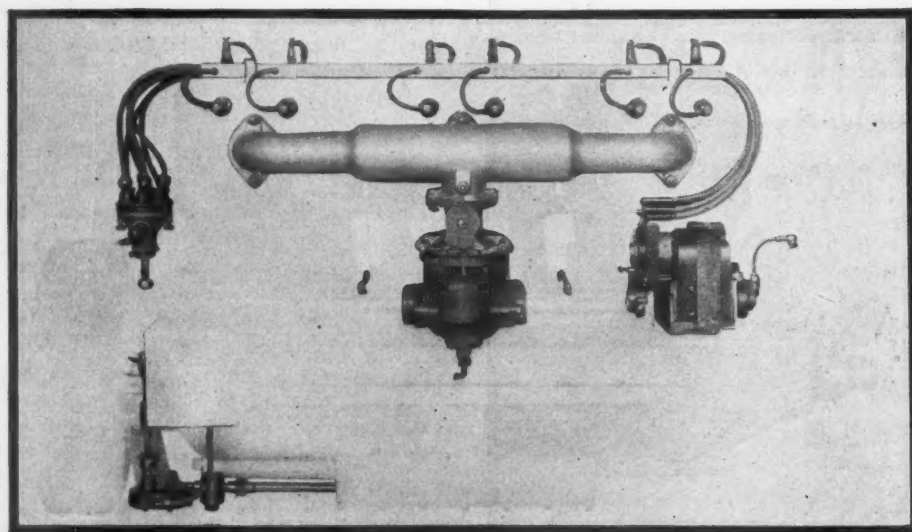
These are the four natural divisions into which the cars classify themselves. The \$1,000 car this year has a 27.6 horsepower motor, with a bore of 3.96 inches and a stroke of 4.26. These are the average figures obtained by taking all the different chassis types in the association which sell from \$1 to \$2,000. Comparing this \$1,000 car with a \$1,000 car of 1 year ago, there is a perceptible increase of horsepower, as the 1910 one had a rating of 22.5. This shows that the buyer is getting more power for his money than he did a year ago. For comparison sake some of the leading details of the \$1,000 car for this year, as compared with last



THE THOMAS 40-HORSEPOWER SIX-CYLINDER USES A DOUBLE SET OF IGNITION APPARATUS AND LIKE PRACTICALLY ALL SIX-CYLINDER MOTORS, CARRIES THE MAGNETO AND CARBURETER ON THE SAME SIDE, WITH THE MAGNETO AT THE FORWARD END. THE INTAKE PIPE IS A LOOP, WITH THE CARBURETER HUNG VERY LOW



THE MITCHELL SIX USES A LOOP INTAKE MANIFOLD WITH AN OFFSET PIECE TO UNITE WITH THE CARBURETER, DUE TO THE PROXIMITY OF THE MAGNETO. THE IGNITION CABLES ARE CARRIED IN A FIBRE TUBE AS ILLUSTRATED. HOSE IS USED INSTEAD OF METAL IN THE WATER SYSTEM THROUGHOUT



THE PALMER AND SINGER INTAKE MANIFOLD, WHICH NECESSITATES THE MIXTURE TRAVELING THE SAME DISTANCE TO ALL SIX CYLINDERS. THE IGNITION CABLES FOR BOTH IGNITION SETS ARE CARRIED IN THE SAME HOUSING

year, are tabulated side by side herewith, so that the reader can draw his own conclusions:

Parts of Car	1910	1911
Horsepower	22.5	27.6
Bore, inches.....	3.75	3.96
Stroke, inches.....	4	4.26
Piston displacement, cu. in. 190.8	195.5	
	Percent	Percent
Thermo-syphon cooling.....	50	50
Circulating oiling.....	100	75
T-head cylinders.....	0	6
L cylinders.....	68	100
Valve-in-head.....	0	23
Separate cylinders.....	50	31
Cylinders in pairs.....	0	47
Cylinders en bloc.....	50	22
Single ignition.....	50	25
Double ignition.....	0	9
Dual ignition.....	50	66

While these figures show in general the trend of construction of the \$1,000 motor, they are apt to be misleading in one or two respects. The figures show that circulating oiling has dropped from 100 to 75 per cent. This is literally not true, but is due to the large number of concerns that have joined the association during the year and which do not use the circulating system. There is not a case on record of a concern which used the circulating last year but has discontinued it this year, so that the circulating type has not gone backwards, but its showing has been impaired by the influx of new members into the association. The same is true in some other respects. One cannot help but note the fact that the T-head cylinder has gained during the year. There has been a drop in the use of separately-cast cylinders; the method of casting in pairs has increased wonderfully, and there has been a reduction in the monobloc percentage. This does not mean that concerns using it have discarded it, but the percentage has been brought about by the doubling of the membership in the association. There is a noted change in the ignition system. For cheap cars the single ignition is losing, this system being fitted on 25 per cent of all the \$1,000 cars.

Leaving the motor details of the \$1,000 car and looking into some of its general specifications, it will be noted that the wheelbase is 101½ inches, a gain of ½-inch on the average wheelbase of the \$1,000 licensed car for last year. There has been a gain in the use of multiple-disk clutches, 60 per cent of the cars using this type, as compared with 30 per cent employing the cone design. Last year it was an equal race of 50 per cent each between the multiple disk and cone forces.

Analyzing the 1911 \$1,000 car in the gear-set field, it is noted that 74 per cent of these cars use selective sets, 16 planetary and 10 per cent friction drive. Of those using the selective set 83 per cent have three forward speeds and 17 per cent two forward. The three-speed selective set has gained very materially during the year.

The shaftdrive does not show as high a year ago, when all the licensed cars employed this means of transmission. Today, but 84 per cent use shaft and 16 use chain. This does not mean that

some have changed from shaft to chain during the year, but that several of the concerns joining the licensed association during the last season use chain drive.

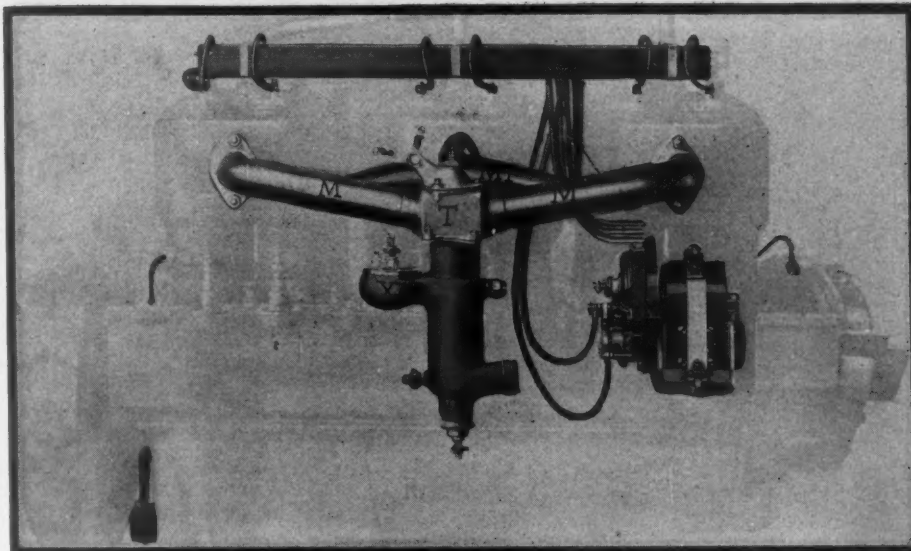
All told the \$1,000 car of this year is considerable of an improvement over that of a year ago. Roughly speaking, it is four-cylinder construction, giving the preference to L-type cylinders, cast in pairs, and water cooled. It is fitted with a tubular radiator, high-tension dual ignition system, gravity feed of gasoline to the carbureter, circulating pump system of oiling, multiple-disk clutch, three-speeds selective gearset.

THE \$1,500 CAR

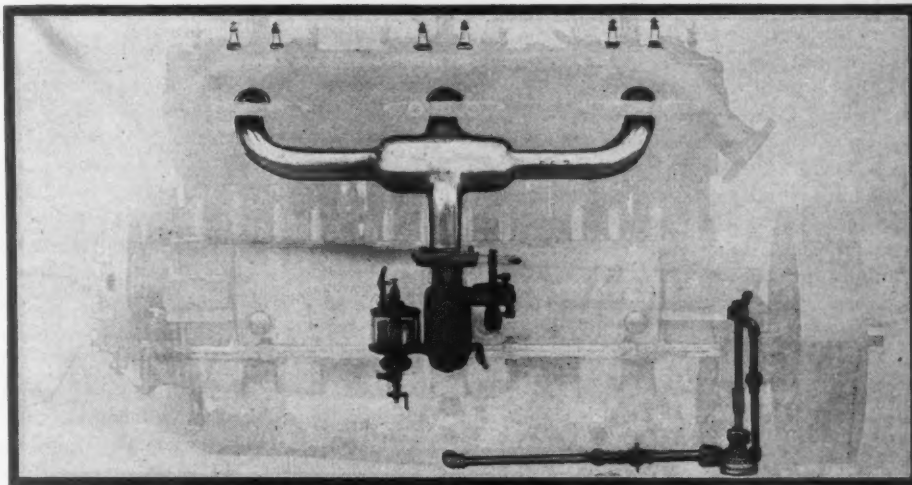
There have been a lot of changes in the motor of the \$1,500 car, as compared with the same priced car of a year ago. For this amount of money the buyer this year can get a 28.6 horsepower machine, as compared with a 27.8 horsepower one. For \$1,500 the buyer can get as much motor as he got a year ago for \$2,500. The piston displacement of this new car is 261.6 inches, as compared with 249 cubic inches of last year. The \$1,500 licensed car must be called a long-stroke one in that the average bore of all the motors in this class is 4.2 inches and the stroke 4.65 inches. For the convenience of the reader the details of the 1911 \$1,500 car and the 1910 car of the same price are set down side by side, and where certain phases of construction have shown a decrease this decrease must be viewed in the light that the membership of the association has doubled during the past year. The relative figures are:

Parts of Car	1910	1911
Horsepower	27.8	28.6
Bore, inches.....	4.17	4.2
Stroke, inches.....	4.5	4.65
Piston displacement, cu. in..	249	261.6
	Percent	Percent
Thermo-syphon cooling.....	33	33
Circulating oiling.....	100	84
T-head cylinders.....	0	13
L cylinder.....	100	58
Valve-in-head.....	0	26
Separate cylinders.....	67	20
Cylinders in pairs.....	0	60
Cylinders en bloc.....	33	20
Single ignition.....	0	16
Double ignition.....	67	43
Dual ignition.....	33	44

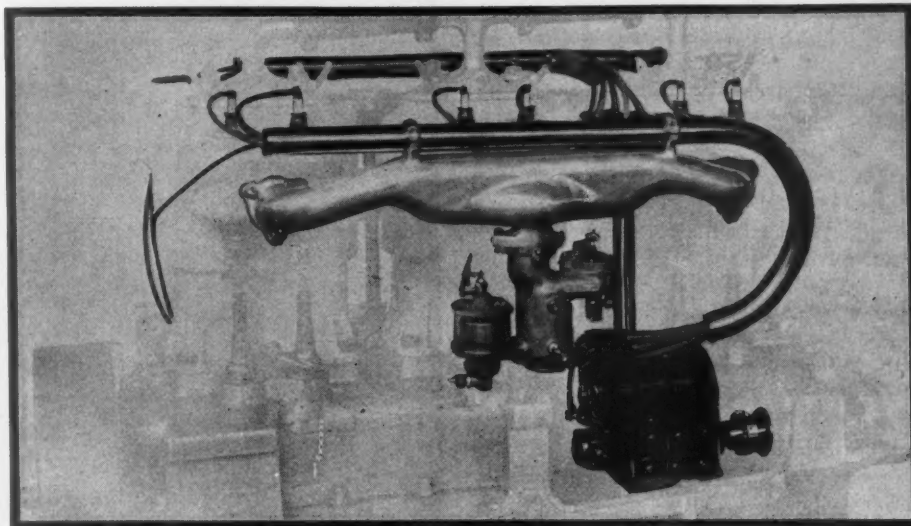
At a glance these figures show that thermo-syphon cooling has not gained in the slightest, but is holding its own. There is a perceptible increase in the use of the T-head motor, which is accounted for by the fact that certain concerns have brought out a new motor and it has invariably been of the T-head design because this allows of a more symmetrical arrangement of the carbureter, magneto and other parts. The big increase in the valve-in-the-head design is due to the fact that many of the concerns joining the association during the last year used this type, among them being noted the Stoddard-Dayton, Jackson, Dorris, Mitchell, Moon, Reo and others. The dual ignition has gained 11 per cent on these cars, and the single ignition system has also gained, the net result being that the use of a



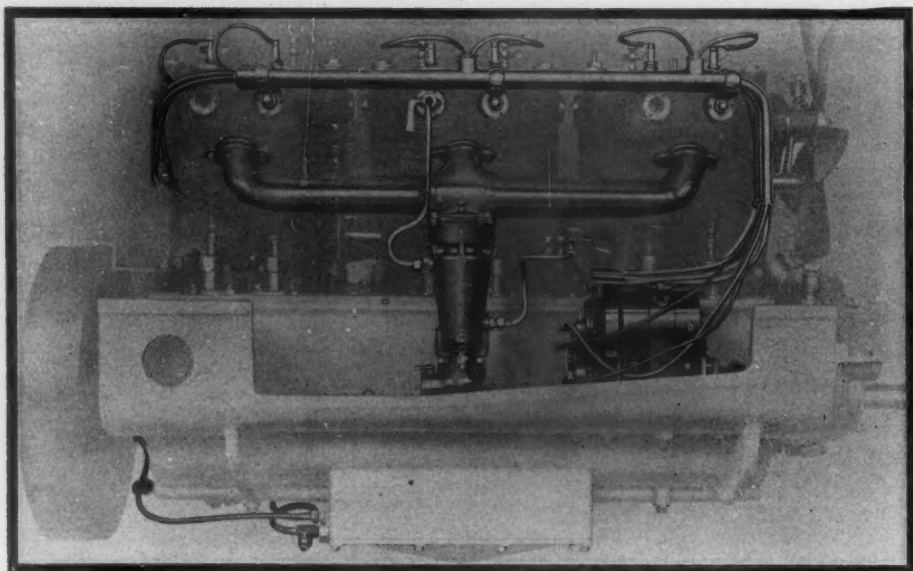
CARBURETER WITH INTAKE MANIFOLD AND WIRING SYSTEM ON THE NEW LOCOMOBILE SIX-CYLINDER CAR. THE INTAKE PIPE IS A PECULIAR LOOP IN WHICH THE TWO BRANCHES TO THE CENTER CASTING ARE ON THE INSIDE OF THE MAIN Y-SHAPED CASTING. THE MAGNETO CABLES ARE WELL ENCASED



A NOVEL INTAKE PIPE IS USED ON THE SIX-CYLINDER KISSELKAR. IT IS A T PIECE ENLARGED AT THE JUNCTION OF THE VERTICAL WITH THE CROSS TUBE, THIS ENLARGEMENT BEING A DOUBLE PASSAGE SO THAT THE MIXTURE TRAVELING TO THE TWO CENTER CYLINDERS HAS TO GO AS FAR AS THAT TO THE TWO END CYLINDERS



THE LOZIER SIX INCORPORATES THE LOOP IN THE MANIFOLD PROPER. THE CARBURETER IS WELL ELEVATED, AS PRESSURE GASOLINE FEED IS USED. TWO IGNITION SYSTEMS ARE FITTED AND TWO TUBES USED FOR THE CABLES



ON THE SIX-CYLINDER ALCO MOTOR A NEW TYPE OF CARBURETER IS USED IN WHICH THE NEEDLE VALVE IN THE NOZZLE IS RAISED BY A DIAPHRAGM, ACTUATED BY THE SUCTION OF THE MOTOR. THE IGNITION CABLES ARE CARRIED IN A SET OF THREE TUBES CARRIED ALONG THE RIGHT SIDE OF THE MOTOR; THE INTAKE MANIFOLD IS A SIMPLE T DESIGN, WHICH LEAVES THE VALVE SPRINGS ACCESSIBLE

double set of plugs has dropped from .67 to .43 per cent.

A chassis analysis shows that the \$1,500 car has grown considerably during the last year. It now has a wheelbase of 113 inches, as compared with 109 inches a year ago. There has been a slight alteration in the clutch situation, 50 per cent using the multiple disk, 38 the cone, and 12 per cent friction. Last year there were no examples of friction drive, consequently the percentage of those employing the multiple disk has fallen slightly. There is, however, an increase in the use of the selective gearset, 85 per cent of the cars using this, and of this number all give three forward speeds.

THE \$2,500 CAR

The motor in the \$2,500 car is considerably bigger than in the same car of a year ago, and all through this motor there is a pronounced imitation of the designs and constructions used in the \$4,000 car. The apparent reason for this imitation is that the \$2,500 maker tries to give in the way of accessories to his motor practically the same equipment as the \$4,000 maker does. The \$2,500 car is a 33.9-horsepower machine, as compared with 28.6 of a year ago. This motor has a bore of 4.5 inches, and a stroke of 4.9. Its piston displacement is 326.8 inches, as compared with 261.2 of a year ago. This is the biggest change in the motor in any of the classes, being a 25 per cent increase in displacement over the past year. This has been brought about by increasing the bore; that is, the average bore, from 4.2 inches last year to 4.5 inches this year, and increasing the stroke from 4.7 inches last year to 4.9 inches for this season.

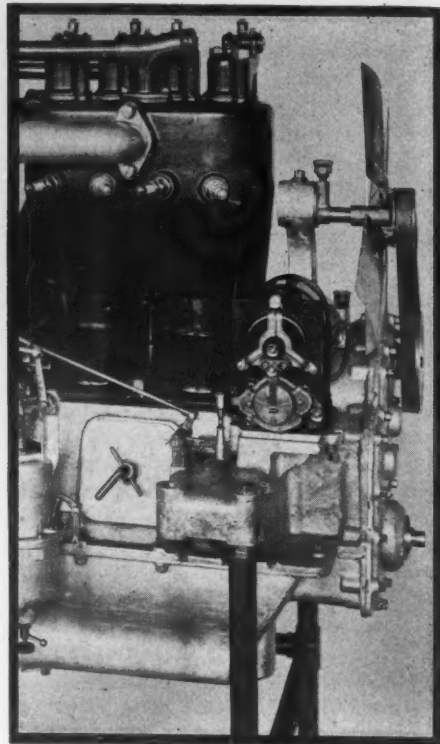
Again for the matter of comparison, which is the only true method of getting a general summing up of the motor situation, the leading details of the 1910 and 1911

motors in these classes are placed side by side, and are as follows:

Parts of Car	1910	1911
Horsepower	28.6	33.9
Bore, inches.....	4.2	4.5
Stroke, inches.....	4.7	4.9
Piston displacement, cu. in.	261.2	326.8
	Percent	Percent
Thermo-syphon	30	3
Circulating oiling.....	80	87
T-head cylinders.....	20	28
L cylinder.....	50	49
Valve in head.....	0	20
Separate cylinders.....	40	20
Cylinders in pairs.....	40	72
Cylinders en bloc.....	20	8
Single ignition.....	10	13
Double ignition.....	30	43
Dual ignition.....	20	44

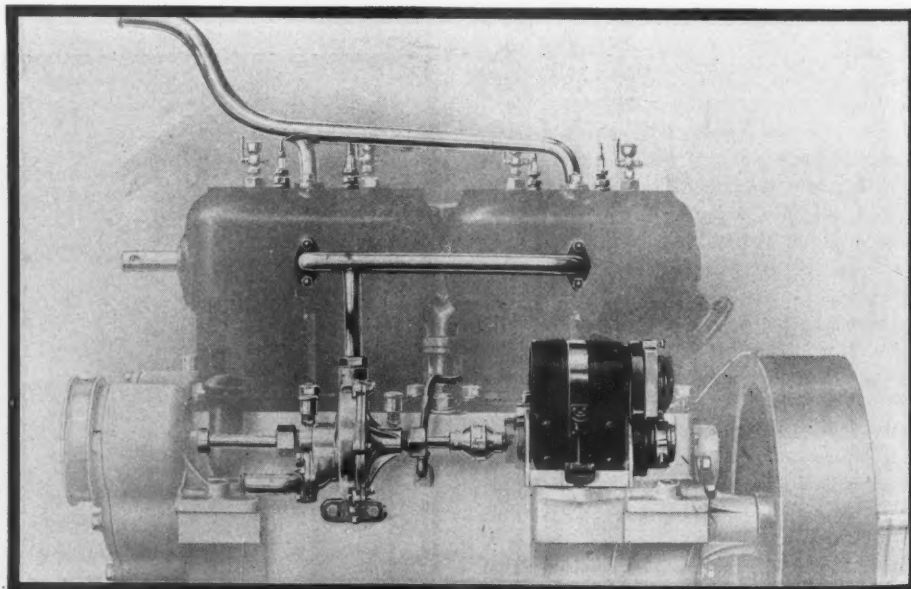
It is not necessary to mention other than in a cursory way that the dual ignition has gained very perceptibly, the double ignition has gained, the single ignition has gained, and the make-and-break or low-tension system practically dropped out of consideration,

Transverse Shaft at the Front of Motor To Drive



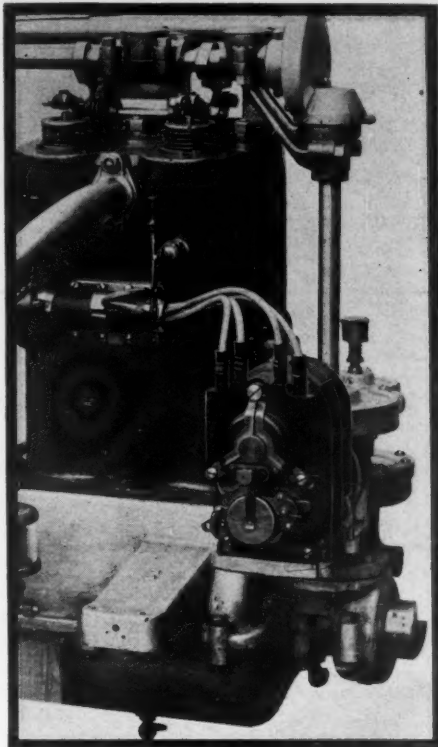
ON THIS PAGE IS SHOWN THE NEW MOUNTING OF THE MAGNETO ON THE POPE-HARTFORD CARS. IT IS CARRIED ON THE RIGHT END OF A TRANSVERSE MOTOR SHAFT, ON THE OTHER END OF WHICH IS THE WATER PUMP. WITH THE MAGNETO SO MOUNTED THE DISTRIBUTOR END IS MOST ACCESSIBLE, AS IS THE BREAKER BOX MECHANISM. THIS IS ONE OF THE GREAT ADVANTAGES OF MOUNTING A

there only being one or two concerns fitting make-and-break as a separate stock equipment for this year. The double system has gained in this type of car, whereas it has lost in the \$4,000 car, the apparent reason being that the change has been a selling argument for the lower-priced car as already referred to.



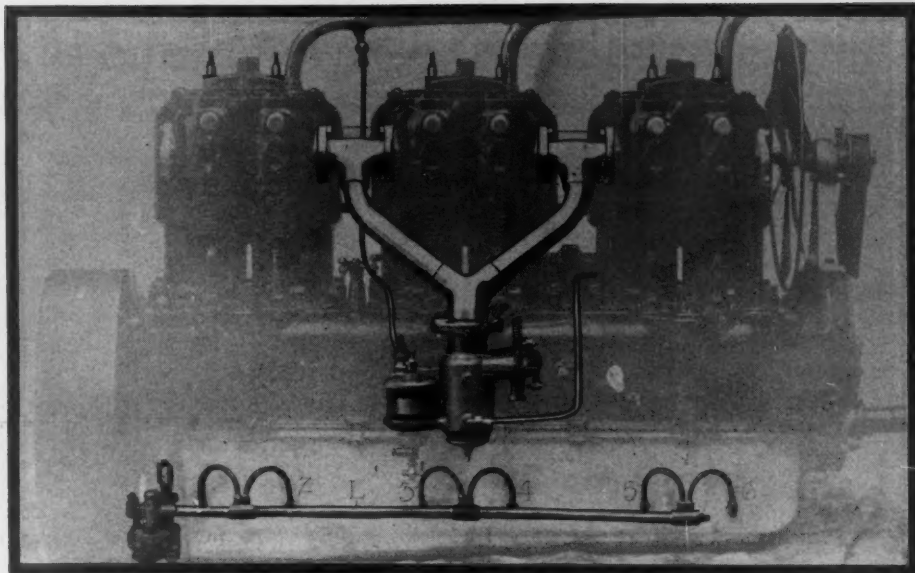
THE NEAT MAGNETO AND WATER PUMP LOCATION ON THE CHALMERS 40, ALSO THE WATER PIPING

Magneto and the Pump, Shown on Several Motors



MAGNETO SO. ON THIS PAGE IS SHOWN THE MAGNETO SIMILARLY MOUNTED ON THE MOON MOTOR. THE LAMBERT MOTOR, WITH ITS FOUR CYLINDERS CAST EN BLOC, MOUNTS THE MAGNETO IN THIS POSITION, AND ON THE NEW HUDSON THE SAME SCHEME OF SUPPORT IS USED. THE RENAULT SET THIS FASHION IN THE MOTOR WORLD, AND IT IS BEING GENERALLY FOLLOWED IN EUROPE

In a cursory analysis of the chassis of the \$2,500 car there is a growth in the wheelbase from 112 inches of a year ago to 119 inches today, so that the present \$2,500 car has a wheelbase almost equal to that of the \$4,000 car of a year ago. This car shows an increase in the tire sizes fitted. Last year the average tire



THE PREMIER SIX USES A Y MANIFOLD, EACH BRANCH ENDING IN A T UNION BETWEEN THE CYLINDER CASTINGS, THE CASTINGS HAVING COREWAYS TO THE VALVE CAGES. A WATER-JACKETED STROMBERG IS USED ON THIS MODEL AND A SCHEBLER ON THE FOUR-CYLINDER TYPE. THE EXTERNAL OIL PIPES USED IN THE NEW CIRCULATING OILING SYSTEM ARE SEEN TO ADVANTAGE, AS IS THE GEAR OIL PUMP

size on the front wheel was 33.8 inch, this year it is 35 inches. The average size on the rear wheel last year was 34 inches, this year it is 35. It is a good indication of standardization to know that for 1911 the same diameter of tire is used on the front and rear wheels. It is also noticeable that the average size on the front wheels is 4 inches and on the rear wheels 4.1 inches.

There is a marked improvement in the chassis construction of this car, as compared with a year ago, as the percentage using multiple-disk clutches has increased from 30 to 33.

With this type of car the selective gearset is by long odds the leader, 95 per cent following in its wake, with 5 per cent using the progressive type, and there is not a single example of friction gearset. Of these cars, 85 per cent use gearsets

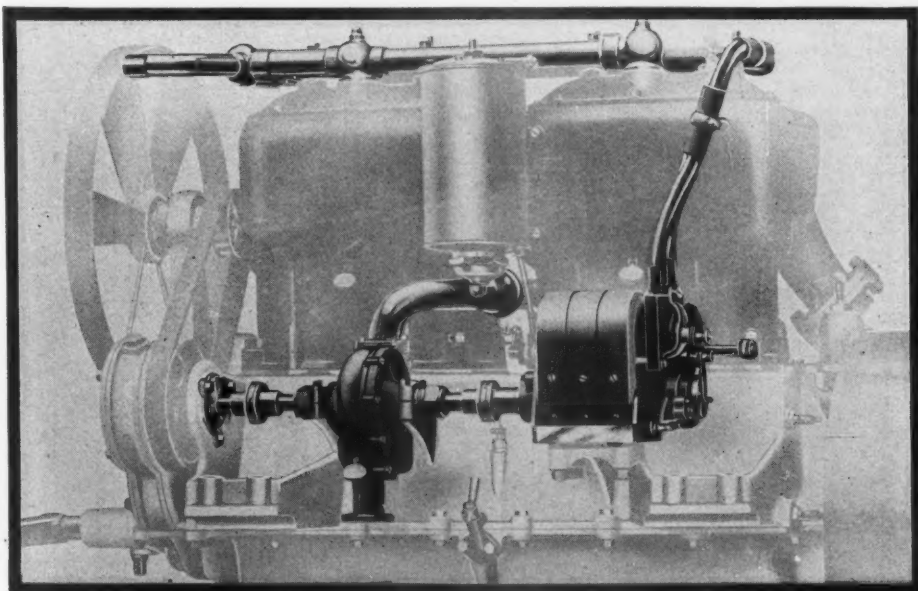
with three forward speeds and 15 per cent with four forward variations. Last year but 10 per cent of these cars fitted a four-speed set. Shaft drive remains as it was a year ago, 100 per cent of the cars using this. This is the only car in which 100 per cent use shaft drive.

Summing up the status of the \$2,500 car as the leading percentages shown in the table on page 42 indicate, it can be stated that the motor is an L-type design with the cylinders cast in pairs, water cooled by pump circulation. The radiator is a cellular type, dual ignition is fitted, gasoline feeds to the carburetor by gravity, lubrication is by circulating pump, a cone type of clutch is fitted, the gearset is a selective design with three forward speeds, and drive is by shaft. It should be noted that this car differs from the \$1,000 car and also the \$1,500, in that it uses a cellular radiator.

THE \$4,000 CAR

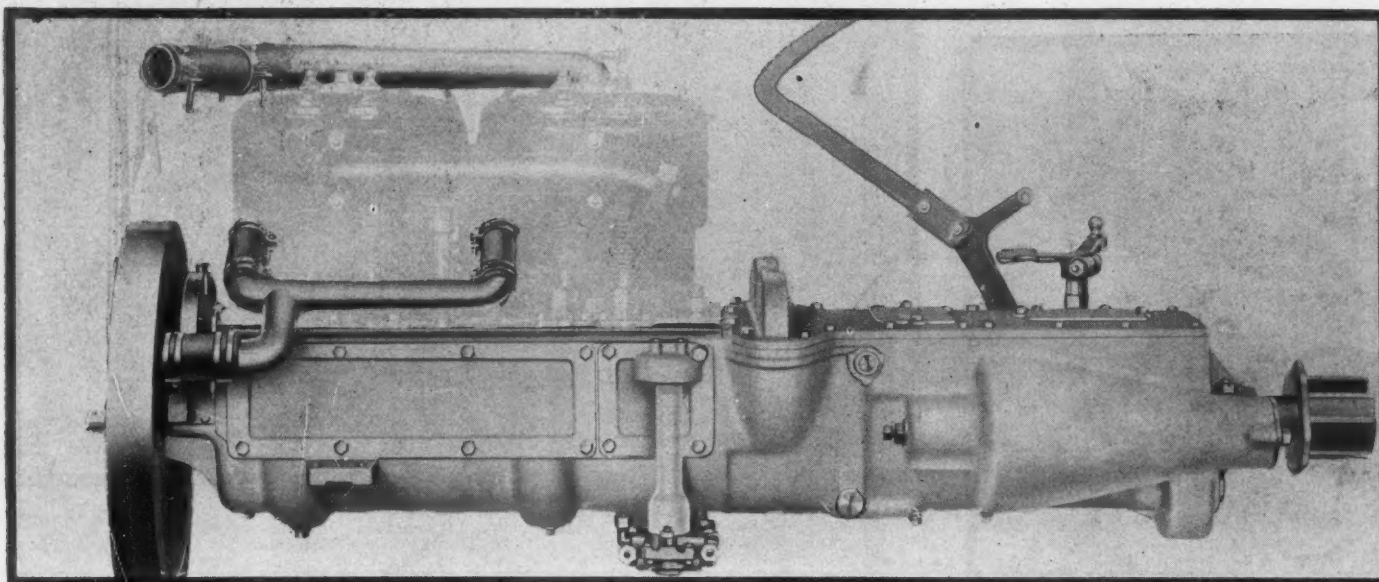
The \$4,000 car, that is, the machine listing over \$3,000, shows the least change of any of the types as compared with a year ago. This car might be called the backbone of the industry in that it is manufactured in smaller quantities and by a great many concerns as compared with the number of houses building cheaper machines. For this year the \$4,000 car is 44 horsepower, last year it was 42.2. The average bore of all the cars in this class is 4.9 inches, and the stroke 5.28, giving a piston displacement of 468.6 inches. The average piston displacement last year was 424.7, there being an increase of practically 10 per cent in the piston displacement. Comparisons show that the average bore has been increased from 4.7 to 4.9, and the stroke from 5 to 5.28.

These figures will convince the reader that there is a strong indication of conservatism in the manufacture of the high-priced car, there not being that tendency for such innovations as the long-stroke as more appar-



ON THE AMERICAN THE WATER PUMP AND MAGNETO ARE ON THE SAME SIDE, THE CABLE SUPPORTS ARE SHOWN

Unit Constructions of Motor and Gearset Continue To



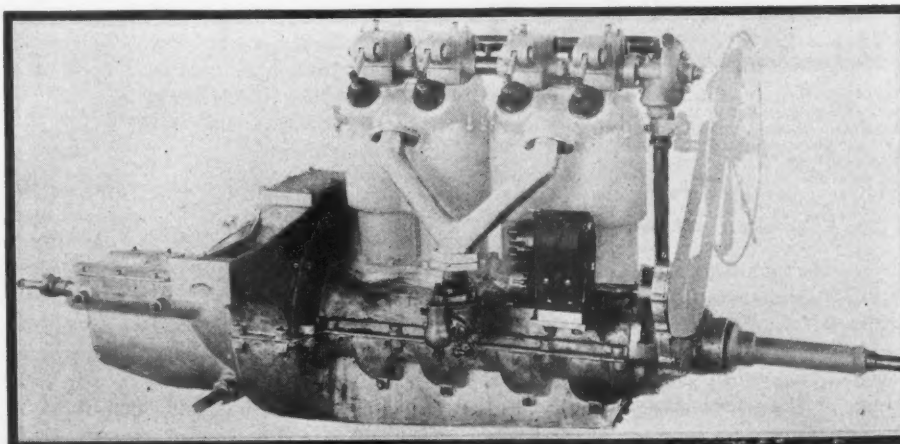
THE MAXWELL MODEL I WITH MOTOR, CLUTCH AND GEARBOX AS ONE AND FRONT-END FLYWHEEL

ent in the cheaper machines. The leading features of the 1910 and 1911 cars are set down side by side herewith:

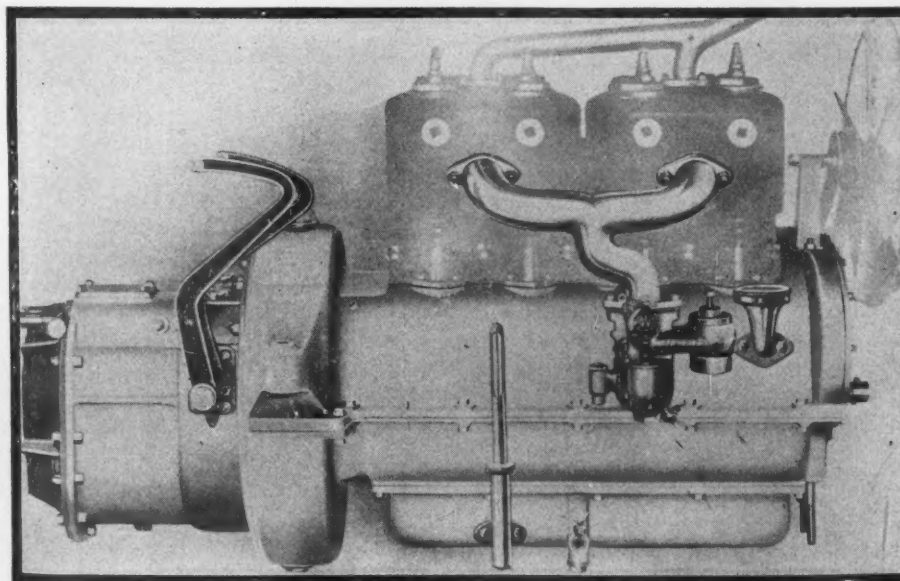
Parts of Car	1910	1911
Horsepower	42.2	44
Bore, inches.....	4.7	4.9
Stroke, inches.....	5.06	5.28
Piston displacement, cu. in.	424.7	468.6
	Percent	Percent
Thermo-syphon	0	0
Circulating oiling.....	71	71
T-head cylinder.....	51	48
L cylinder.....	27	29
Valve-in-head.....	14	23
Separate cylinders.....	29	14
Cylinders in pairs.....	69	82
Cylinders en bloc.....	2	3
Single ignition.....	16	11
Double ignition.....	47	43
Dual ignition.....	30	44

From a glance at these comparative columns it still remains a settled fact that the large manufacturer has no interest whatever in thermo-syphon circulation. This is in striking contrast with the French industry in which thermo-syphon cooling is at present being used in several of the largest motors built by the different concerns. The circulating oiling system shows to have just held its own, but as a matter of fact it has gained. The percentage being held down by not a few concerns who have joined the licensed forces during the year and who have not used this system. In the matter of cylinder design there is a slight decrease in the T-head type, and increase in the L design, and a 50 per cent increase in the valve-in-the-head construction. The separate cast cylinder is on the decline, which is evidenced by concerns such as the Corbin, which in its new models has brought out the twin casting in place of the individual type. There is a little loss in single ignition. Many makers do not take the ignition problem very seriously and as a result give broad options. It is a fact that many concerns use the ignition system as a handle in selling cars.

Front-end Flywheel Is Still Used on a Few Models

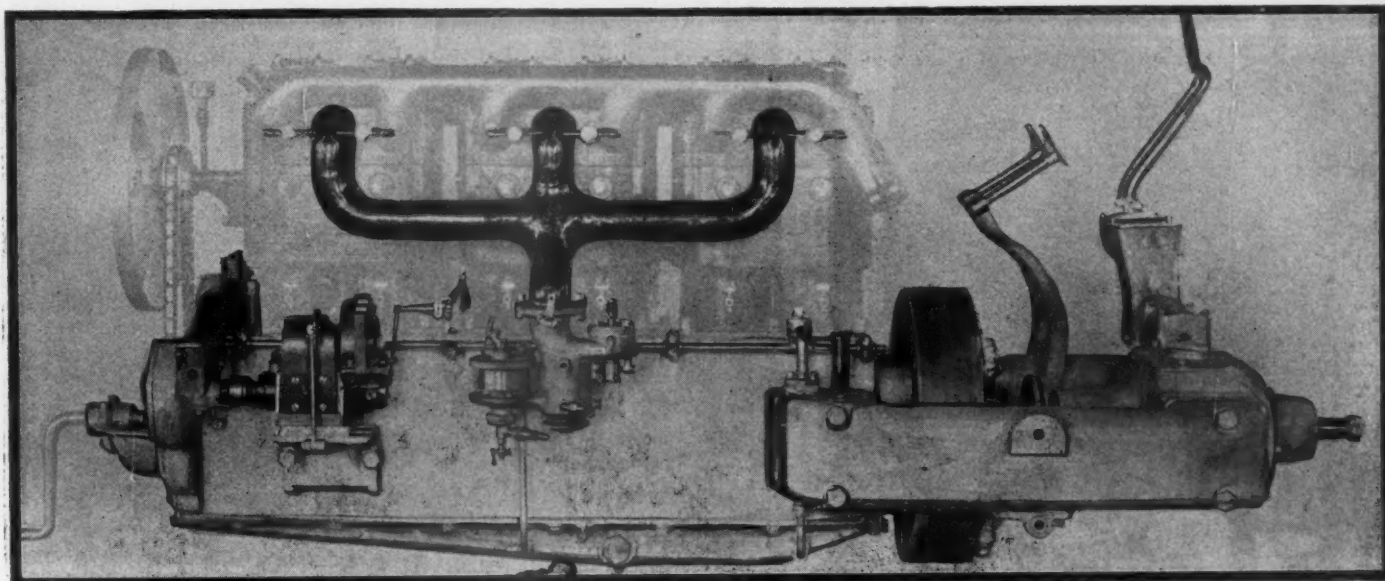


THE JACKSON UNIT MOTOR AND GEARBOX, IN WHICH THE FLYWHEEL IS USED TO CIRCULATE THE OIL IN THE MOTOR



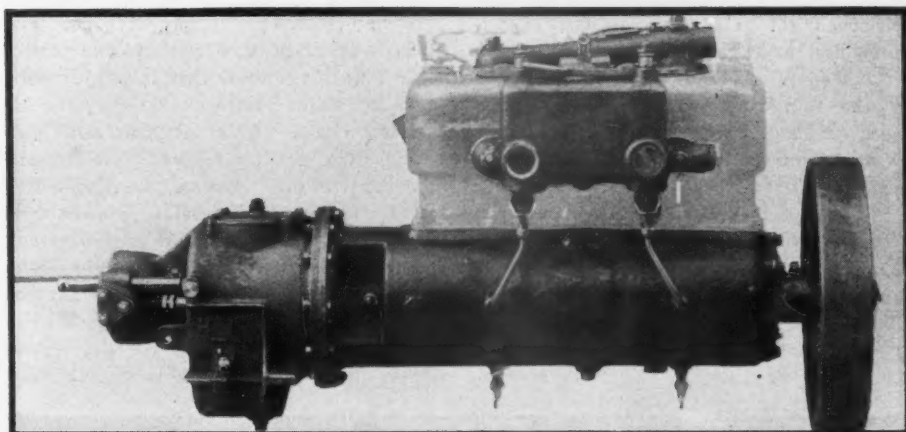
THE OHIO UNIT CONSTRUCTION IS CARRIED ON A THREE-POINT SUPPORT, THE SINGLE POINT BEING AT THE FRONT-END. THE FLYWHEEL IS ENCLOSED

Retain Position of Last Year But Show Little Gain

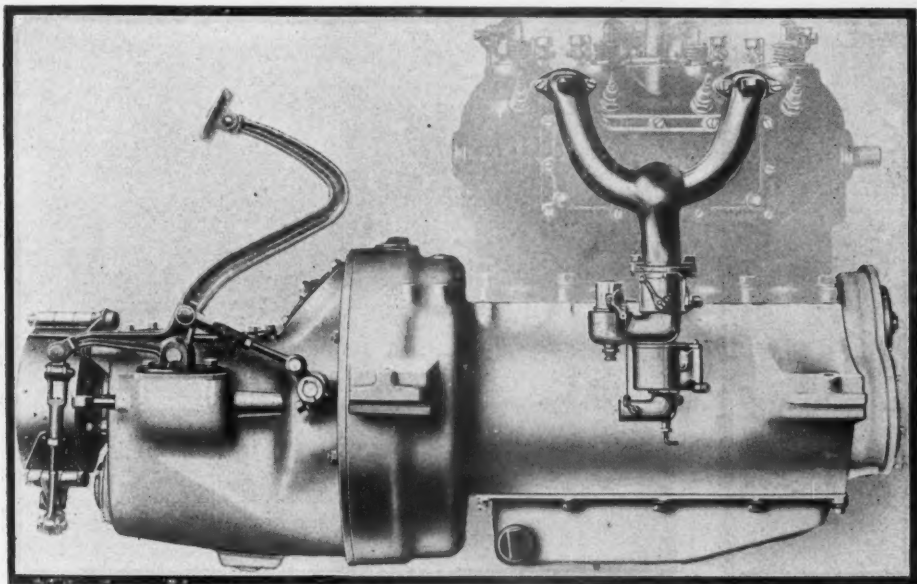


SIX-CYLINDER KNOX, WITH UNIT, MOTOR AND GEARBOX AND THREE-POINT SUSPENSION

And Enclosed Flywheel on Medium-Powered Cars



THE HUPMOBILE COMBINED MOTOR CLUTCH AND GEARSET. NOTE THE FLYWHEEL AT THE FRONT END AND GRAVITY OILER

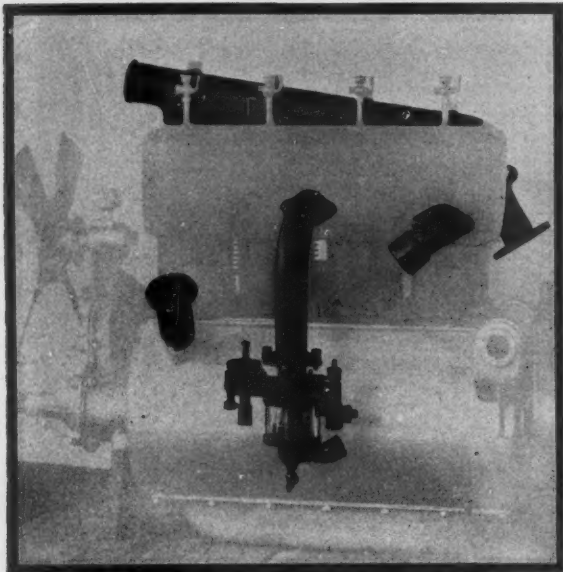


THE CHALMERS 30 UNIT POWER PLANT, WITH ENCLOSED FLYWHEEL AND BRAKE ON THE GEARBOX. FOUR-POINT SUSPENSION IS USED

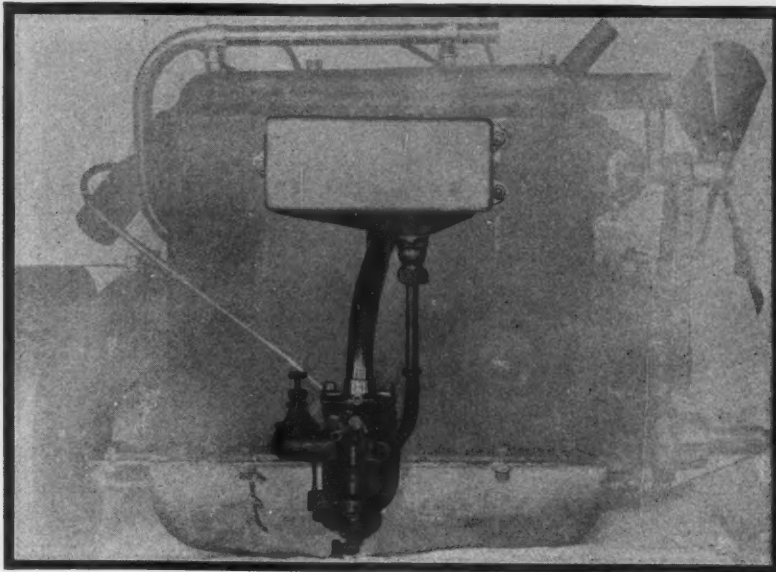
The chassis on the \$4,000 car has not changed much from a year ago. The average wheelbase is now 123 inches as compared with 122 at that time. This indicates that a year ago the large car makers had practically solved the question of length of wheelbase, and the increase of 1 inch in the average for the year is brought about by many of the concerns who have largely increased the size of their cars, rather than by a slight addition on many of the old models. The larger output of six-cylinder cars also answers this to a certain extent. There has also been an increase in tire sizes. The average of the front tire a year ago was 35.6 by 4.2. Today it is 36.2 by 4.3—a healthy gain and one which should be appreciated by the car owner. The size of the rear tires on this average car has also been increased. Last year the average was 35.6 by 4.5; this year it is 37.6 by 4.6. An increase of 2 inches in diameter, namely, from 35 to 37 inches, is very acceptable. This has been brought about by a general increase by nearly all of the concerns. Many companies last year which fitted 34-inch wheels on all models have jumped to 36, and those which fitted 36 have increased to 37, 38 and 39 inches on the large seven-passenger cars. The 42-inch tire has not gained any followers during the year. Two or three concerns listed cars with tires of this size a year ago and they are still listing them. It is now, however, a settled fact that on high-powered, seven-passenger touring cars the 37 and 38-inch sizes have come to stay.

It is remarkable in analyzing the chassis details to note how closely the percentages of last year are to those of this. Last year 58 per cent used multiple-disk clutches; this year 56 employ them. This is a slight loss. Last year 31 per cent used the cone; this year 36 per cent, which indicates a sound confidence in this pioneer

The Monobloc Motor Combines Simplicity of Piping and



PIPING ON SAMPSON MONOBLOC MOTOR



CARBURETER AND OILER ON EVERITT MONOBLOC

type of clutch. There has been a loss in the internal-band type from 4.5 to 2 per cent; and there is also a slight loss in the external-band type, which has dropped from 6.7 to 6. It is noted that wherever there is a gain or a loss in the percentage of any particular design, the change is very slight, showing that this class of manufacturer is conservative, and only changes after having thoroughly convinced himself that such an alteration is for the betterment of his car.

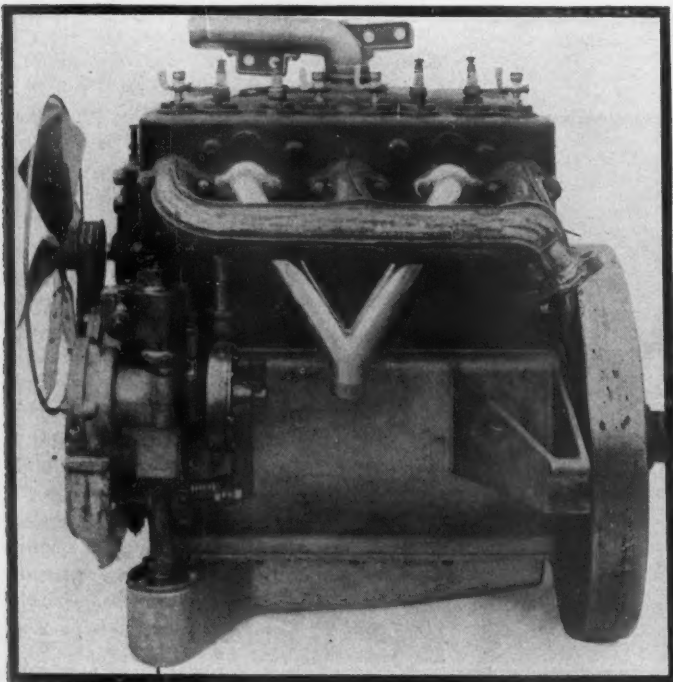
When it comes to the matter of gearsets there has been a pronounced change in favor of the selective set, the percentage growing very materially, and now standing at 97, with but 3 per cent employing

the progressive design. The three-speed set has 38 per cent and the four-speed 62. This is the only classification in which the four-speed set rules, and in the \$1,000, \$1,500 and \$2,500 car the three-speed set is the leader. Abroad the tendency is to use the four-speed set entirely in high-priced cars and very generally in medium-priced machines. Next year it will not be surprising to find the four-speed a leader in the \$2,500 car and to have shown gains in the \$1,500 one. As might be expected, there is not an example of friction or planetary sets in this classification.

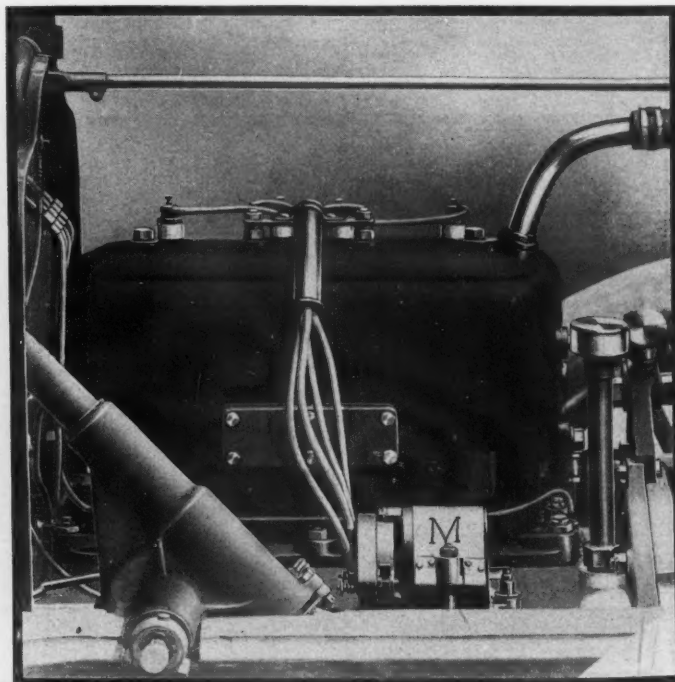
There still remains a number of chain-driven cars, Thomas, Chadwick, Simplex and others continuing as exponents of

these types. As it is, 91 per cent use shaft and 9 per cent the chains.

Summing up the \$4,000 car from the leading percentages in the different divisions it is, in brief, a four-cylinder motor with T-head cylinders cast in pairs. Cooling is by water pump circulation. The car is fitted with a cellular radiator, dual ignition system, gravity feed of gasoline, circulating oiling system, multiple-disk clutch, four-speed selective gearset and shaft drive. The reader cannot overlook the fact that there is not a single example of thermo-syphon circulation; that the cellular radiator leads the tubular three to one; that pressure feed in the gasoline is almost on an even basis with gravity, and

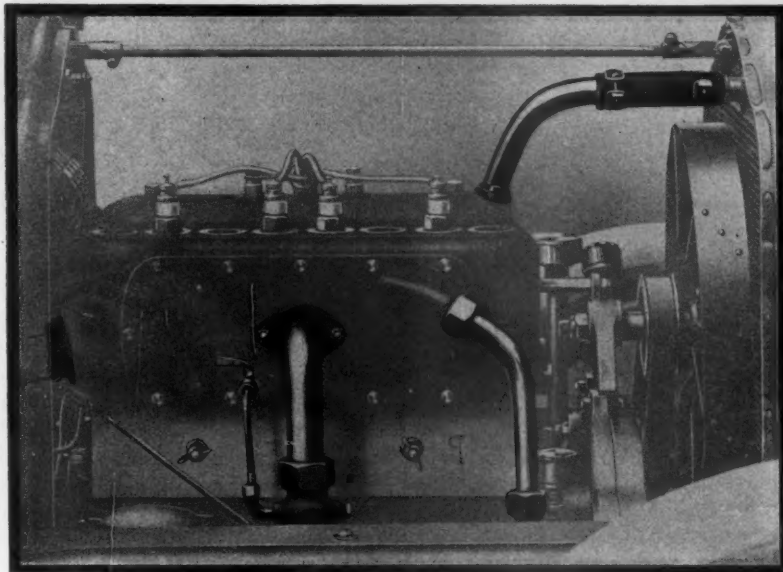


THE MONOBLOC LAMBERT HAS DETACHABLE INTAKE AND EXHAUST MANIFOLDS: THE MAGNETO IS ON A CROSS SHAFT AND THE PUMP AND OILER DRIVEN FROM A VERTICAL SHAFT

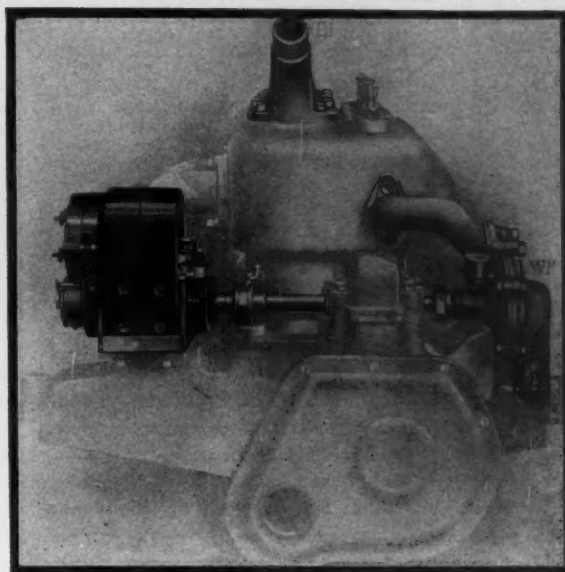


THE WHITE IS ONE OF THE SIMPLE MONOBLOC MOTOR CASTINGS WITH THE INTAKE AND EXHAUST PIPES VERY SHORT, AND THE WATER PIPES ALSO REDUCED TO THE MINIMUM

Layout of Parts Not Found in the Other Motor Types



SIMPLE PIPING ON THE WHITE MONOBLOC



THE TRANSVERSE SHAFT ON THE MONOBLOC HUDSON

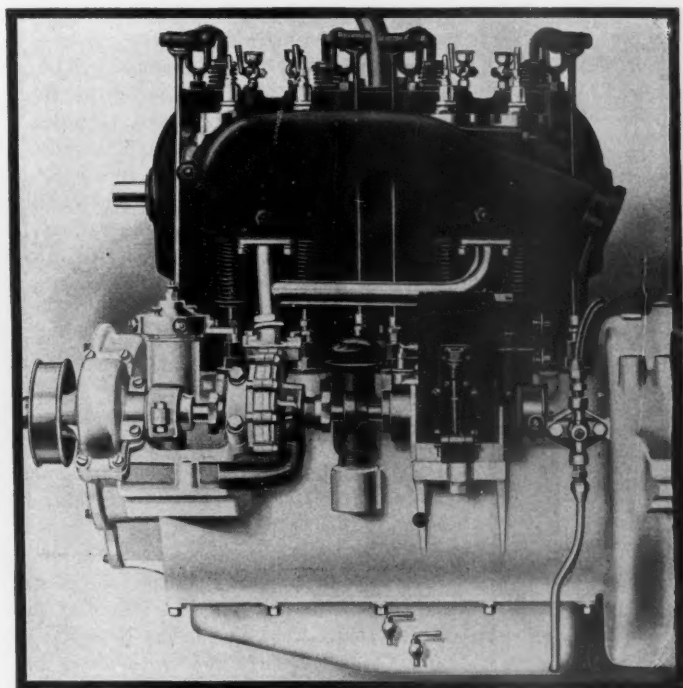
that it is a neck-and-neck race between high-tension and dual ignition.

On these pages are illustrated some of the leading examples of the monobloc motor, which is now establishing itself with quite a few makers. Few new types of this motor have been brought out for this year. One, however, being the Sampson, illustrated herewith. The White company has not only continued its motor of this type, brought out a year ago, but has recently brought out a larger size of exactly the same design, but differing only in the size and strength of the parts. One of the new monobloc motors is the Hudson, illustrated herewith, and which supersedes the monobloc design built by

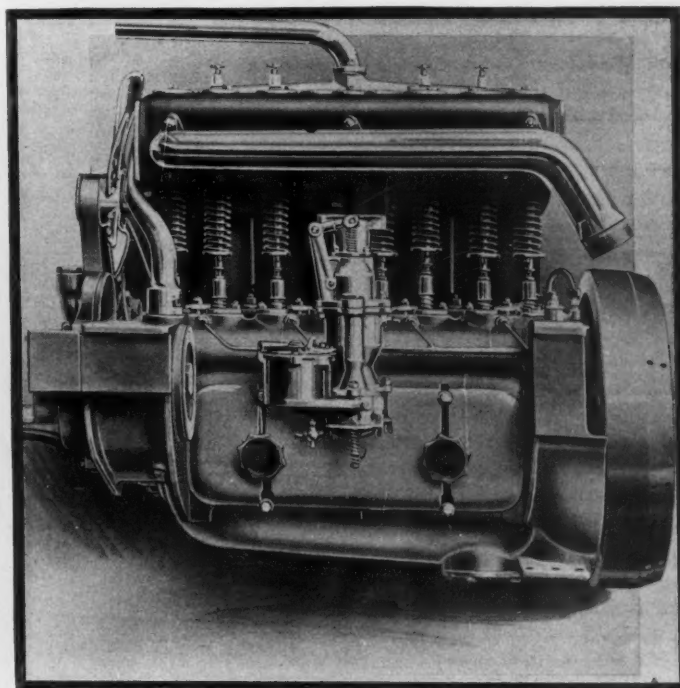
this company a year ago. The reader can not overlook in this motor the transverse shaft at the forward end carrying the magneto and water pump and also the fact that the water pump delivers the cold water into the jackets at the valve chambers where the heat is greatest and where the cold water is most needed. This motor is also built without a fan, the air circulation being maintained by fan blades in the flywheel. It uses separate exhaust pipes, the apparent object being that the short ones can be fitted for racing purposes. The design of the Stearns monobloc and also the Chalmers and Everitt have not changed much during the last year, except in the simplification of a few

details, such as the wiring in the Chalmers.

In the shadow illustration of these motors the reader cannot but note the simplicity of the piping, which is shown in black in the case of the Sampson, White and Hudson. The intake and exhaust manifolds are but short connections, and the waterpipes almost as brief. This reduction in piping is a feature in manufacture and also in accessibility. With an intake manifold, such as illustrated on the Hudson and White, the accessibility of the valve springs is a certainty. The Hudson is a leader, however, in this respect, in that the carbureter is carried on the side opposite to the valves, so that no intake manifold whatever appears.



THE CHALMERS 30 IS ONE OF THE VERY FEW EXAMPLES OF THE MONOBLOC MOTOR IN WHICH THE INTAKE VALVE IS LOCATED IN THE CYLINDER HEADS. THE EXHAUST MANIFOLD IS A SEPARATE CASTING



IN THE 15-30-HORSEPOWER STEARNS MONOBLOC MOTOR AN L-TYPE OF CYLINDER IS USED. THE CENTRIFUGAL WATER PUMP IS INCORPORATED IN THE LEFT FRONT MOTOR ARM. CIRCULATING OILING IS USED

TIRES *the*

WITH his finger on the pulse of the trade a prominent tire man has predicted that the year of 1911 will be an exceptionally good one so far as his industry is concerned.

"The way I look at it," said he, "there will be a brisk demand for tires for the first 6 months of 1911 and the industry will be kept on the jump to fill the orders. In case the crops turn out the way they are expected to, the last 6 months will be fully as good as the first 6. This prediction is made without taking into consideration the demand for cars themselves. Statistics show that an owner usually gets at least one new set of tires each year, and with the vast number of cars now in use it readily can be seen that this one item alone means a tremendous lot of business for us.

"Seriously, though, I think the coming season is going to be a good one for all branches of the industry. I think the manufacturers of cars have in general been so conservative in making their plans for 1911 that there will be no overproduction and consequently no let-up in the demand for motor cars. In fact, many conservative dealers realize this, and in the larger cities it is no unusual thing to hear of some agents who have stored away in warehouses from 100 to 200 cars picked up during the slack months which will be ready for its delivery when the demand comes in the spring."

Price of Rubber Lower

Show time rolls around again with the tire men in an exceptionally good humor. The price of crude rubber has come down from \$3.07 a pound, where it was a few months ago, until now it hovers in the neighborhood of \$1.50, with the chances good for it dropping even lower. This cannot be verified, however, until the January imports are received, when the rubber men expect to get a good line on the year, for January marks the arrival of the new crop. With the prices of crude rubber apparently right, the tire men look for a good year and are prepared to prove during the next month that they have been busy during 1910 on new ideas for 1911.

No very radical changes in the tire situation have developed for the new year, and it is evident that the factories have devoted considerable of their time to the

development of the non-skid tire which appears in greater number than ever before. Those concerns which have new things to announce invariably produce a non-skid as their trump card when called upon to open the 1911 bag of surprises. This non-skid comes in various forms, each idea, however, being to produce something that will prevent a car from skidding. While the steel-studded tire continues in popularity, it is easy to be seen that the designers have worked on the theory that rubber can be made to answer the same purpose. Therefore they have produced goods with non-skidding propensities in which rubber is the most important consideration, said rubber consisting of an extra tread so to speak, which generally either is corrugated or has raised knobs or lettering which serve the same purpose.

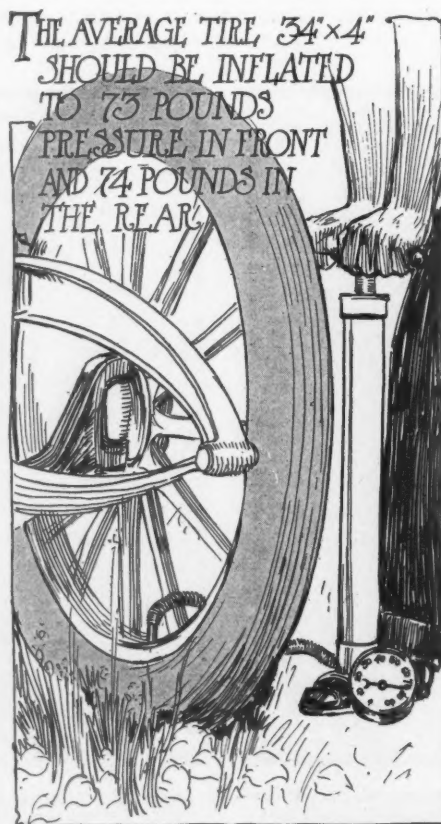
Among the new non-skids which are appearing on the market for 1911 are the Swinehart, Empire, Pennsylvania and Continental, while such old standbys as the Bailey, Michelin, Diamond, Firestone, Re-

public and Morgan & Wright are retained.

The Diamond and Goodrich companies have something of interest in the way of the Diamond-Silverton and the Palmer web tires which differ from the conventional and which are just gaining a footing in the American market. The Palmer web tire is a continuation of the old Palmer bicycle tire in that it has a different fabric than is commonly used in motor car tire construction. The Palmer fabric is made of two layers of linen thread, spirally wound upon a pure gum tube, each thread embedded in rubber and out of contact with its neighbor. The two layers in turn are separated by a wall of pure rubber and one wound at an angle of 45 degrees together, the result being a seamless, endless, spirally-laid tube. In general the Diamond-Silverton is of the same idea except that cord is used instead of thread. The Diamond-Silverton comes from England from the people who were licensed to make the Palmer bicycle tire years ago and who have developed the cord idea since. It is called the Diamond-Silverton to avoid a confusion of names.

Demand for Larger Tires

Outside of the non-skid and thread and cord tires, the main features of the coming season seem to be the demand for larger sized tires and also casings of the intermediate sizes. By intermediate sizes is meant a casing of 35 by 5 or 37 by 5½—in between the sizes usually furnished by the car makers. This demand undoubtedly has been brought about by the failure on the part of some makers to under-tire their cars, and the demand for the intermediate sizes, it is noticeable, comes from the consumer as a rule and not the maker. It is evident from this that an owner after using his car for a year finds that by putting on a little larger tire he can get away from some of the trouble. Of course a tire man does not tell an owner in so many words that his car is under-tired, for that would not be policy—it might be considered a knock on the car maker. Therefore the tire man becomes politic and gently suggests to the user who complains of tire trouble that maybe he can get better service out of larger tires and urges him to try it anyway. Such a change is made possible by the fact that most rims will accommodate larger sizes than what they are



SOLE of the CAR

scheduled at. For instance, it is possible to put a 35 by 4½-inch tire on a 34 by 4-inch wheel. The result of this interchange is that the owner gets a larger tire which will stand a good deal more road abuse than a smaller one will. Of course, it will cost him more to use the larger sizes, but it is a good investment in that he will reap rich returns in the way of longer service and freedom from puncture, comparatively speaking, it is claimed. Probably this extra increase in price will not amount to more than 7 or 8 percent, but most tire makers argue that it is a mighty good investment.

No Greater Profit

Some skeptics might suspect a colored gentleman in the woodpile when they are urged to buy the larger sizes, and hint that the dealers boost a big tire because of the extra cost, but common sense should show that in reality the tire people realize no more from the sale of a 35 by 5 than they do a 34 by 4—they simply get their usual per cent on their investment.

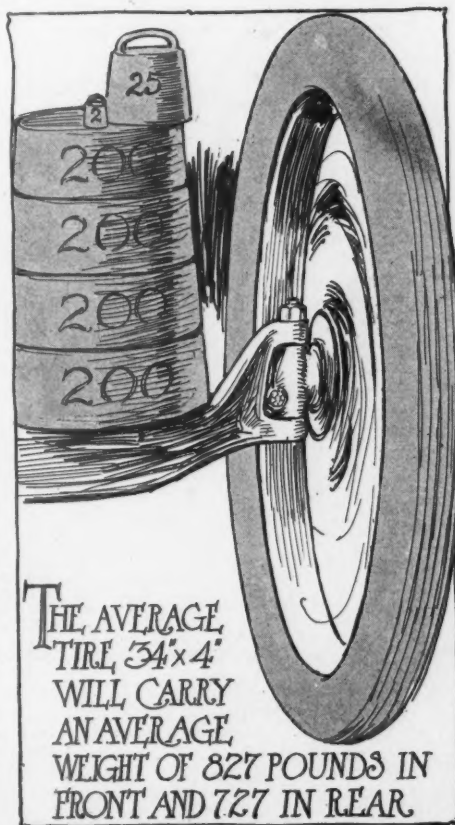
Along these same lines one can argue as to the economy of the non-skid. They cost more, of course, probably from 10 to 15 percent more, but, like the intermediate sizes, they give better service, it is argued. It is asserted that non-skids give 50 percent more wear in the way of actual service because of the extra tread that is put on to secure the non-skidding qualities. The user can get the benefit of this extra tread for many, many miles and then when it is worn down there is the original tread still ready for use.

Average Size 34 by 4

It is evident from statistics that have been gathered that the average sized tire for 1911 will be the 34 by 4. Indeed, the statistics taken on 186 cars that will be in the garden show demonstrate this fact. This compilation of figures shows that on the front wheels the average sized tire will be 34.85 by 4.16, while the rears will be 35 by 3.95. This shows that if anything the licensed makers are inclined to get slightly above this average. The tendency is to have the front tires slightly larger in diameter but smaller in circumference. This increase undoubtedly is caused by the advent of the large wheels advocated by several of the prominent American makers,

such as the Oldsmobile and Owen with 42-inch wheels, the American, Kisselkar and Rambler with 40-inch, the Pierce-Arrow and Oldsmobile with 38 and the Thomas with 37. If one were to go into the statistical end of it he would probably discover that the average sized wheel on the high-priced model is 36 by 4½. This increase in the size of tires has been growing steadily for several years, for in 1906 the average was 30 by 3½, while in 1908 it had climbed to 34 by 4, where it seems to have stuck.

Considerable attention is being given by tire manufacturers to the electric trade, and of late several tire concerns have brought out pneumatic ideas designed for this type of vehicle. At the present time the Palmer web is being pushed along this line, but the Goodrich company is bending every effort to perfecting the tire for use on gasoline cars, and at the present time it has the idea pretty well worked out, although not quite ready to put it on the general market.



Tires for commercial vehicles are being given much thought and nearly every concern has something new listed in this direction. Some go in for side-wire tires, some for the side flange and others the bolted-on type. The Fisk, for instance, has brought out a truck tire, a pneumatic, that is fitted to a demountable rim; the Michelin is introducing the twin pneumatic for truck use, while the Goodrich has a wire-less tire for which it claims big things.

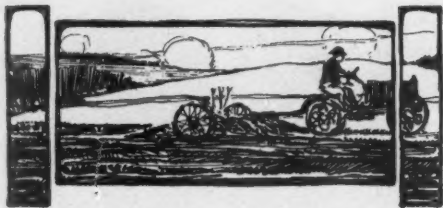
The tire people say there is a great future in the truck business and they are preparing for a big business in their line. They say that in great cities especially the business men are just beginning to realize that the motor for industrial purposes is coming into its own.

Inflation the Keynote

Tire science also is well demonstrated in the literature which is being scattered broadcast from Akron and other rubber centers. The keynote of it all is inflation, it being asserted that if owners would pay more attention to this detail and see that their tires are of sufficient hardness that there would be fewer cases of rim cuts and blowouts caused by under inflation. Every concern almost has issued tables showing the proper pressure to put in tires. Some favor more pressure than do others, Morgan & Wright being the extreme as to the requisite hardness. Herewith Motor Age presents a table in which are compiled the tire inflation suggestions as made by twelve concerns. It is interesting to note that averaging up the lot on what is considered to be the average size of tire at the present time—34 by 4 inches—that the pressure recommended for the front tire is 73 pounds, while on the rear it is 74 pounds.

Along with this table is presented its mate, figures showing how much weight each wheel should carry. Here some variance is found, some concerns giving the weights when the car is loaded with passengers and its complement of tools, gasoline, oil and water, while the majority arrive at their figures with the car in the condition it is found on the dealers' floor. Here it is discovered that the average weight for the front wheel is 827 pounds for a 34 by 4 inch tire, while the rear is 727 pounds.

So far as the trade as a whole is con-



cerned, it has not had much chance to fully investigate the value of the Mexican product, guayule, which is gathered from shrubs indigenous not only to Mexico but Texas as well. It is claimed it will take at least a year to give guayule its commercial status so far as motor car tires are concerned, but while all this is going on the tire trade is watching results with a great deal of interest, believing that if Mexico can furnish the solution of the problem that it will not be long before the trade will be in such a position that it will not have to worry over the rubber situation in South America or lose sleep because the English stock market sends the prices of the crude product up beyond the reach of ordinary mortals.

Facts About Guayule

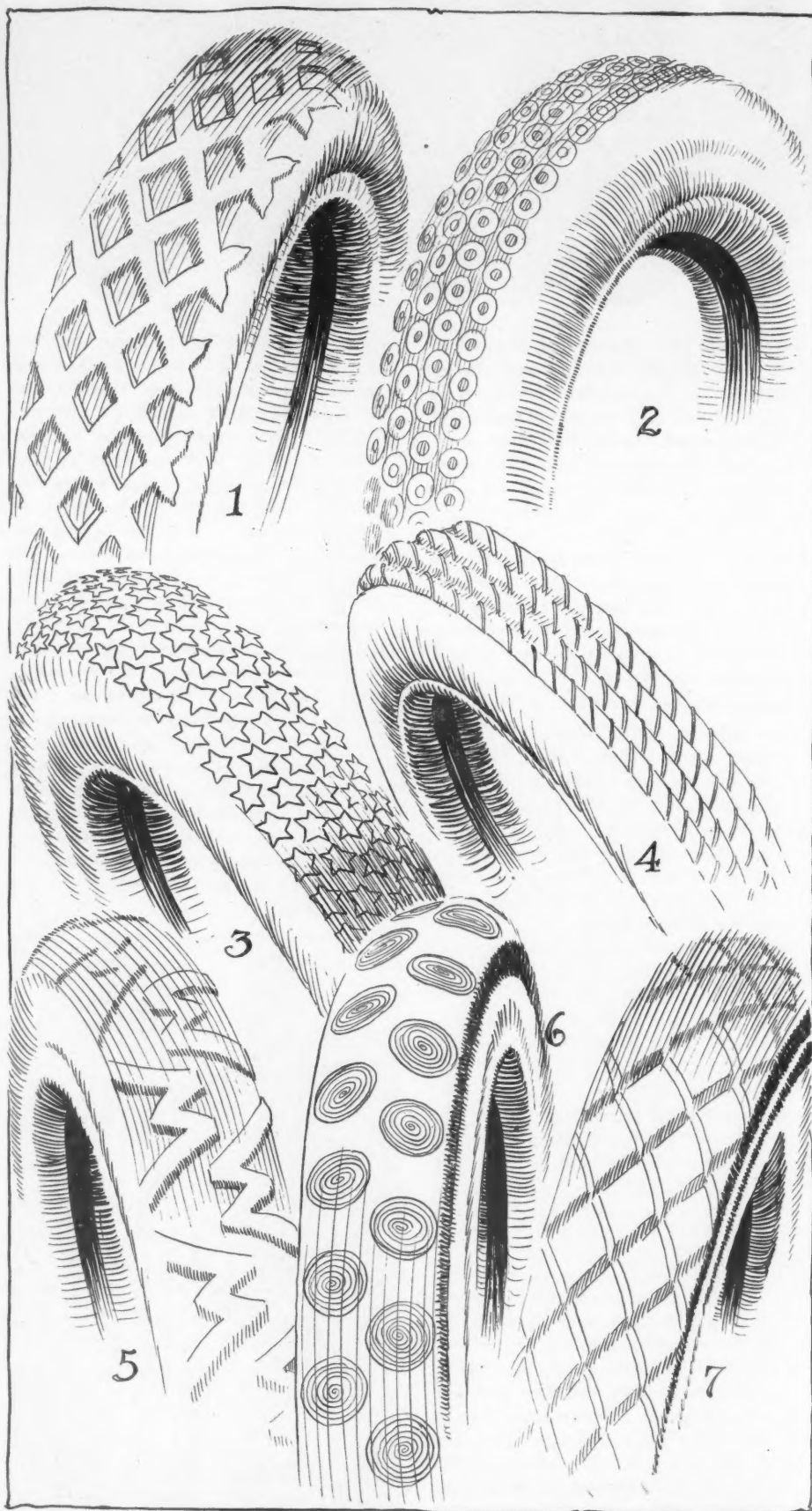
The drop in the price of crude guayule rubber from \$1.15 gold per pound to 60 cents gold per pound within the last few months has not caused any apparent curtailment of production of the product, judging from the enormous shipments that are being made from the Torreon district in Mexico. The bulk of these shipments goes to New York. The official statistics of the industry show that one concern, the Intercontinental Rubber Co. and its subsidiaries, shipped approximately 1,200,000 pounds of crude rubber from Mexico to New York during the month of November. The record of December shipments is not yet available, but it is reported that those of this concern will aggregate about 1,500,000 pounds, or a total of about 2,700,000 pounds for the 2 months. At the current price of the product the revenue obtained from this enormous output was about \$1,620,000 gold.

Next to the Intercontinental Rubber Co. the largest manufacturer of crude rubber in Mexico is the Madero interests, headed by the venerable Evaristo Madero of Pararas, state of Coahuila. The shipments made by the Maderos during the month of November aggregated approximately 750,000 pounds, all going to New York. For December these interests had an output equally as large as the previous month, thus bringing in a monthly revenue to the Madero family from this one source of approximately \$450,000 gold.

Big Shipments Made

Besides these two larger crude rubber producers there are a number of independent concerns operating in this part of Mex-

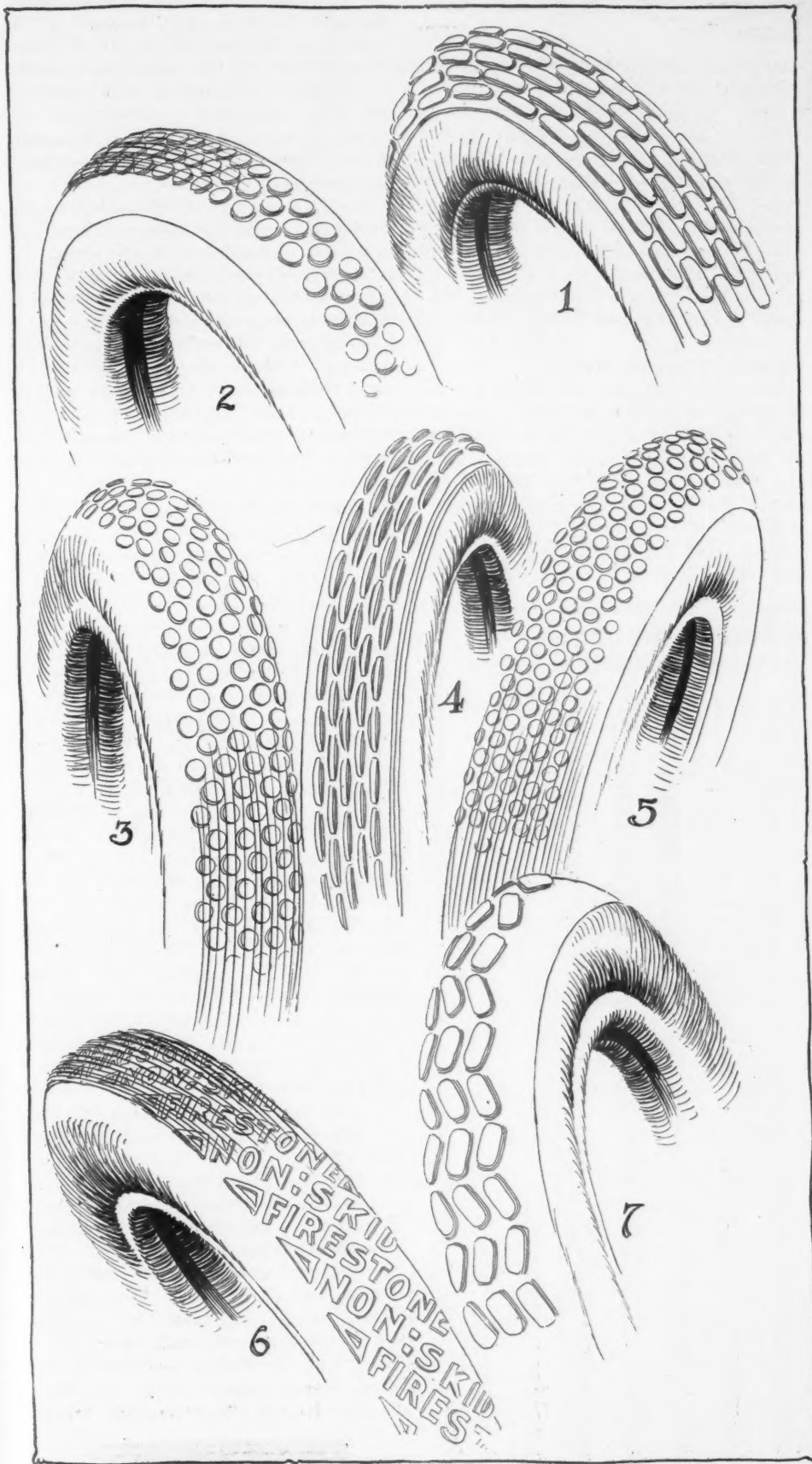
Latest Ideas in Non-Skid Tires



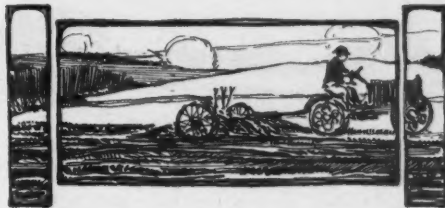
- 1—SWINEHART'S NEW TIRE
- 2—PENNSYLVANIA VACUUM TREAD
- 3—THE STAR NON-SKID TIRE
- 4—MIDGELEY USED BY HARTFORD
- 5—THE MILLER ANTI-SKID
- 6—EMPIRE DISK TREAD TIRE
- 7—AJAX NON-SKID TIRE



Protection For the Motorists



- 1—REPUBLIC STAGGARD TREAD
- 2—MICHELIN STEEL-STUDD TIRE
- 3—DIAMOND NON-SKID
- 4—CONTINENTAL TRAXION TREAD.
- 5—THE BAILEY TREAD TIRE
- 6—FIRESTONE NON-SKID
- 7—MORGAN & WRIGHT KNOBBY TREAD



ico which are said to have monthly outputs aggregating more than 500,000 pounds. This makes, all told, a monthly production of crude rubber from the guayule shrub of more than 2,750,000 pounds, having a market value of \$1,650,000 gold or more.

The industrial world is just awakening to the great importance of this new industry, which came into being within the last decade. English capital has recently become interested in the manufacture of crude rubber from the guayule shrub and an effort is being made to build up a large market for the product in Europe. Shipments already are being made direct to England, France and Germany.

Is Unknown Quantity

The manufacturers of guayule rubber have endeavored, it is said, to keep the knowledge and importance of the new industry from the general public. Even the rubber trade itself was not aware until recently of the enormous production that comes from this new source of rubber supply. In most instances the crude product lost its identity when it passed through the refining process and went upon the market. But for the fact that the consular invoices of shipments and the official reports of the production that must be made to the Mexican government are open to public knowledge it is probable that it would have taken a long time for the importance of the industry to become generally known.

Cost of Manufacturing

There is a diversity of statements as to the cost of manufacturing the crude rubber from the guayule shrub. These estimates run all the way from 25 cents to 40 cents per pound. According to the statements of some men who have been identified with the industry, the average cost of manufacture is as low as 10 cents per pound. The profit depends largely upon the price that is paid for the shrub and the cost of delivering it to the factory. The Intercontinental Rubber Co. and the Maderos own and have leased vast tracts of land, aggregating many millions of acres, upon which the guayule shrub grows abundantly. Enormous quantities of the shrub are also purchased from private land owners. In the beginning of the industry, not many years ago, many contracts for the shrub were entered into at prices ranging from \$25 to \$50 Mexican money per ton, and contracts of this kind are





still in effect. One Mexican land owner contracted to sell 20,000 tons of the shrub at \$4 Mexican money per ton, and he was forced to let it go at that price. During the past summer the price of the shrub advanced to as high as \$350 Mexican money, or \$175 gold per ton. The price began to drop in September and the shrub is now selling for \$180 to \$200 Mexican money per ton.

The fact that methods have been discovered for propagating the shrub is believed to insure the permanency of the industry.

While the big shows of January and February are not expected to bring out any very radical departures in tire construction, yet the early signs are that nearly every concern will have something a little out of the routine for the consumers to inspect at New York and Chicago. Goodrich has the Palmer web mentioned above, and in addition is most proud of a new wireless truck tire which has sev-

eral novel features. Morgan & Wright are bringing out a special tire for electric vehicle equipment and besides this continue to boost their well-known nobby-tread non-skid. Michelin also is strong on the anti-skid proposition and has both types, the rubber tread and the steel-studded. The G & J company is rushing along a new anti-skid for the show, but up to now has not been in the position to go into details as to its construction. Diamond has its Diamond-Silverton cord tire for a trump card.

Swinehart's Rempes Tread

Among the other new things that will be noted will be the Rempes non-skid brought out by Swinehart, which also has a bolted-on flange truck tire. The Empire has a disk tread non-skid that is a sufficient departure from the conventional to attract attention. Pennsylvania sticks to its vacuum tread non-skid, but believe it has improved upon it by reducing the number

of rows of vacuum cups from four to three. In addition it is offering the Polack tire for truck use, a solid which is made under license from the foreign inventor. The Continental people recently put out their Traxion tread non-skid which is somewhat of a departure in this line, while the Star and Miller each has a non-skid that is in keeping with the pace that is being set in this direction by the rubber men. Gibney has a new wireless.

The Fisk company believes that larger sizes will be used for 1911, a natural development in keeping with the times. It believes that among the higher-priced cars the popular size will be 36 by 4½ and that the intermediate sizes will meet with a ready demand because of the added air capacity. While marketing its usual line, which includes every type on the market at the present time, the Fisk company continue the manufacture of the bolted-on type, it and the Diamond being the only ones to make this.

Michelin's Non-Skid

The Michelin has a novelty to show in the shape of a non-skid tire that is designed for the equipment of cars that will be on view in the various exhibitions. This tire has an orange leather tread and the non-skidding rivets are nickel plated. The Michelin line for 1911 will include anti-skid round treads and flat treads and a heavy emphasis will be placed upon the Michelin demountable rim. The Michelin people think the average size tire for the coming season will be 34 by 4 and one of the branch managers expressed his opinion that it will not be long before wire wheels, now so popular in England, will come into vogue in this country. His claim is that wire wheels make lighter cars, and lighter cars of course are freer from tire trouble than the heavier ones. It is noticeable that the Michelin company has departed from the conventional in the way it is fitting its non-skids. It places a steel-studded non-skid on the right front and another on the left rear and a rubber tread on the left front and the right rear, the contention being that the rubber treads hold the car firmly on dry pavements while the anti-skids prevent slipping on wet highways. The G & J line will consist of Dunlops, Q. D. clinchers and standard clinchers with the Bailey treads as the company's standby in the non-skid line.

The Goodrich company's line consists of its white tough tread in both regular clincher, quick detachable and straight bead construction. The company also has a metal stud tire with an imported chrome leather tread, through which the steel studs are riveted. This company notices

TABLE SHOWING INFLATION RECOMMENDED FOR TIRES

Size		Michelin	Fisk*	Firestone	Empire	G. & J.	M. & W.	Goodrich	Goodyear	Republic	Ajax	Star
28x3	Front	50	60-65	50	50	50	65	65	60	40	50	55
	Rear	50	65-65	50	55	55	65	65	60	40	50	55
30x3	Front	60	60-65	50	50	50	65	65	60	40	50	55
	Rear	60	60-65	50	55	55	65	65	60	40	50	55
32x3	Front	60	60-65	50	50	50	65	65	60	40	50	55
	Rear	60	60-65	50	55	55	65	65	60	40	50	55
34x3	Front	60	60-65	50	50	50	65	65	60	40	50	55
	Rear	60	60-65	50	55	55	65	65	60	40	50	55
30x3½	Front	60	60-65-70	60	60	60	80	70	70	50	60	65
	Rear	60	60-65-70	60	65	70	80	70	70	50	60	65
32x3½	Front	70	60-65-70	60	60	60	80	70	70	50	60	65
	Rear	70	60-65-70	60	65	70	80	70	70	50	60	65
34x3½	Front	75	65-70-75	60	60	60	80	70	70	50	60	65
	Rear	75	65-70-75	60	65	70	80	70	70	50	60	65
36x3½	Front	75	65-70-75	60	60	60	80	70	70	50	60	65
	Rear	75	65-70-75	60	65	70	80	70	70	50	60	65
30x4	Front	60	.....	75	65	70	90	75	80	60	70	75
	Rear	60	.....	75	70	80	90	75	80	60	70	75
31x4	Front	60	.....	75	65	70	90	75	80	60	70	75
	Rear	60	.....	75	70	80	90	75	80	60	70	75
32x4	Front	70	65-80	75	65	70	90	75	80	60	70	75
	Rear	70	65-80	75	70	80	90	75	80	60	70	75
33x4	Front	70	65-80	75	65	70	90	75	80	60	70	75
	Rear	70	65-80	75	70	80	90	75	80	60	70	75
34x4	Front	75	65-80	75	65	70	90	75	80	60	70	75
	Rear	75	65-80	75	70	80	90	75	80	60	70	75
35x4	Front	75	65-80	75	65	70	90	75	80	60	70	75
	Rear	75	65-80	75	70	80	90	75	80	60	70	75
36x4	Front	75	65-80	75	65	70	90	75	80	60	70	75
	Rear	75	65-80	75	70	80	90	75	80	60	70	75
37x4	Front	75	65-80	75	65	70	90	75	80	60	70	75
	Rear	75	65-80	75	70	80	90	75	80	60	70	75
40x4	Front	75	65-80	75	65	70	90	75	80	60	70	75
	Rear	75	65-80	75	70	80	90	75	80	60	70	75
42x4	Front	75	65-80	75	65	70	90	75	80	60	70	75
	Rear	75	65-80	75	70	80	90	75	80	60	70	75
32x4½	Front	60	.....	85	75	80	95	80	90	70	80	85
	Rear	60	.....	85	80	90	95	80	90	70	80	85
34x4½	Front	70	70-85	85	75	80	95	80	90	70	80	85
	Rear	70	70-85	85	80	90	95	80	90	70	80	85
36x4½	Front	80	70-85	85	75	80	95	80	90	70	80	85
	Rear	80	70-85	85	80	90	95	80	90	70	80	85
38x4½	Front	.....	70-85	85	75	80	95	80	90	70	80	85
	Rear	.....	70-85	85	80	90	95	80	90	70	80	85
42x4½	Front	80	70-85	85	75	80	95	80	90	70	80	85
	Rear	80	70-85	85	80	90	95	80	90	70	80	85
34x5	Front	70	.....	90	80	90	100	85	100	80	90	95
	Rear	70	.....	90	90	95	100	85	100	80	90	95
35x5	Front	70	.....	90	80	90	100	85	100	80	90	95
	Rear	70	.....	90	90	95	100	85	100	80	90	95
36x5	Front	80	75-85	90	80	90	100	85	100	80	90	95
	Rear	80	75-85	90	90	95	100	85	100	80	90	95
37x5	Front	80	75-85	90	80	90	100	85	100	80	90	95
	Rear	80	75-85	90	90	95	100	85	100	80	90	95
38x5½	Front	80	80-90	90	.....	95	100	90	110	90	100	.....
	Rear	80	80-90	90	.....	100	100	90	110	90	100	.....

*Varies according to loading weight per wheel



that the tendency is for higher wheels and that the intermediate sizes are growing in popularity. The Ajax is standing pat on its 1910 line, and while it has not as yet invaded the commercial motor realm, it intends to do so in the near future, the factory now being at work on truck tires, which may be brought out later.

Firestone Favors Large Tires

The Firestone is a firm believer in large tires and advocates their use wherever possible. The contention is that many owners are given to overloading their cars and that when the oversized tire is used this habit is overcome to a certain extent because of the increased air capacity of the larger tire. The Firestone anti-skid is a continuation from 1910, the letters "Firestone" forming the tread.

The Republic at the present time claims that 90 per cent of its business is in the staggered tread tire, which is popular because the heavy tread protects the tires from rupture. They are 15 per cent heavier than the regular tire. This staggered tread consists of six rows of long tuft studs projecting from yet an integral part of the heavy base. These studs are spaced in intervals of one-third their length and so placed that the studs of each alternate row are directly opposite the intervals of the studs on either side.

The Star Rubber Co. is bringing out a new non-skid which is made with a strong tread well braced and reinforced and upon which is molded in the building an indefinite number of stars, which stars have sharp and distinct angles with a varied number of sharp right angles bracing the car against skidding. The claim is made that the sharp angles of the stars grip the road more firmly and forcibly than otherwise could be possible and thus prevent the skidding of the wheels.

Continental in Line

Anti-skid features of the new tire brought out by the Continental company, which is called the Traxion tread, consists of five staggered rows of elevations on the tread, these elevations being approximately twice in circumferential length as they are in width, and so that the danger of tearing them from the tire proper with which they are a corporate part is eliminated. The long circumferential length tends to prevent the slipping sidewise.

The Empire company believes that its disk tread anti-skid is an improvement over what has been brought out in the past. As will be noted in the accompanying illustration, this tread greatly resembles small patches and ordinarily would not be suspected of being an anti-skid. Each of the patches, however, is made of



duck fabric stood on edge in the tread, which gives the tire a great grip on the road and prevents skidding. These disks are 2 inches apart and add considerably to the appearance of the tire. The claim of the Empire people is that this disk tread acts on the same principle as the use of a blanket under the rear wheels to get traction on a wet or icy pavement. Another claim is that the disk tread is noiseless. In addition the Empire company continues the manufacture of its raised and checkered tread casings.

The Electric Tire

In the electric field the Motz has a tire that already has taken well with the trade. The Motz is a cushioned type which has slant-wise bridges, undercut sides and double tread, which seem peculiarly applicable to the electric type of pleasure vehicles. In addition to this the company has three other types, the regular cushion tire, the high efficiency electric and the motor truck.

The Gibney people also are at the shows with their wireless motor tire, which is shown in connection with the Gibney Eleck Trick vulcanizer.

The Miller tires are of wrapped tread construction with the rubber firmly imbedded in the layers of fabric, which form the walls and carcass of the tire. The rubber tread is vulcanized to the carcass. An idea of the appearance of the Miller non-skid may be had from the accompanying illustration.

The Shawmut Tire Co. has its regular line of wrapped tread tires and in addition is putting out a block tread non-skid shoe which is making its debut at the shows.

The Kelly-Springfield line consists of tires in round and Bailey treads which are made for standard clincher and quick detachable rims. Following the trend of the times, this company also lists ten of the intermediate sizes. The largest is a 37 by 5 which fits a 36 by 4½ rim.

TABLE SHOWING WEIGHTS MOTOR CAR TIRES WILL CARRY

Size		Michelin*	Firestone	Empire	Diamond	G & J	Morgan & Wright	Fisk†	Republic	Goodrich	Goodyear	Star
28x3	Rear	300	350	350	350	350	.....	300-400	350	350	350	375
	Front	400	350	425	425	350	.....	300-400	400	425	350	450
30x3	Rear	400	350	375	375	350	.....	300-400	350	375	350	400
	Front	500	350	450	450	350	.....	300-400	400	450	350	475
32x3	Rear	400	350	375	375	350	.....	300-400	350	375	350	400
	Front	500	350	450	450	350	.....	300-400	400	450	350	475
34x3	Rear	400	350	400	400	350	.....	300-400	350	400	350	.....
	Front	500	350	500	500	350	.....	300-400	400	475	350	.....
36x3	Rear	400	350	.....	.....	350	.....	300-400	350	.....	350	.....
	Front	500	350	.....	.....	350	.....	300-400	400	.....	350	.....
30x3½	Rear	400	450	450	450	450	450	500-600	350	450	450	475
	Front	600	450	550	550	450	450	500-600	400	550	450	575
32x3½	Rear	600	550	500	500	550	550	500-600	400	500	550	525
	Front	700	550	625	625	550	550	500-600	500	600	550	650
34x3½	Rear	700	600	550	550	600	600	500-600	500	550	600	575
	Front	800	600	675	675	600	600	500-600	700	650	600	700
36x3½	Rear	700	600	600	600	600	600	500-600	.....	600	600	625
	Front	800	600	750	675	600	600	500-600	.....	700	600	800
30x4	Rear	650	550	.....	600	550	550	600-900	.....	625	550	650
	Front	800	550	.....	675	550	550	600-900	.....	750	550	800
31x4	Rear	800	.....	.....	.....	.....	.....	.....	.....	.....	.....	800
	Front	800	.....	.....	.....	.....	.....	.....	.....	.....	.....	800
32x4	Rear	800	650	650	650	650	650	600-900	.....	650	650	650
	Front	1000	650	800	800	650	650	600-900	.....	800	650	800
33x4	Rear	800	.....	.....	.....	.....	.....	.....	.....	.....	.....	800
	Front	1000	.....	.....	.....	.....	.....	.....	.....	.....	.....	800
34x4	Rear	950	700	700	700	700	700	600-900	700	700	700	725
	Front	1100	700	875	875	700	700	600-900	800	875	750	900
35x4	Rear	950	.....	.....	.....	.....	.....	.....	.....	.....	.....	725
	Front	1100	.....	.....	.....	.....	.....	.....	.....	.....	.....	725
36x4	Rear	950	750	750	750	750	750	600-900	800	750	750	775
	Front	1100	750	900	900	750	750	600-900	1000	900	750	925
37x4	Rear	950	.....	.....	.....	.....	.....	.....	800	.....	.....	.....
	Front	1100	.....	.....	.....	.....	.....	.....	1000	.....	.....	.....
40x4	Rear	950	.....	.....	800	.....	.....	600-900	800	850	.....	.....
	Front	1100	.....	.....	950	.....	.....	600-900	1000	1000	.....	.....
42x4	Rear	950	.....	.....	.....	.....	.....	600-900	800	900	.....	.....
	Front	1100	.....	.....	.....	.....	.....	600-900	1000	1050	.....	.....
32x4½	Rear	700	.....	1100	700	700	700	900-1400	1000	750	700	.....
	Front	900	700	1100	900	900	900	900-1400	1300	950	700	.....
34x4½	Rear	1100	700	900	900	900	900	900-1400	1000	900	800	850
	Front	1300	900	1125	1125	1000	1000	900-1400	1300	1125	800	1100
36x4½	Rear	1100	900	100	1000	1000	1000	900-1400	1000	975	900	850
	Front	1300	1000	1250	1250	1000	1000	900-1400	1300	1225	900	1100
42x4½	Rear	1100	1000	.....	.....	.....	.....	1000-1600	.....	1200	.....	.....
	Front	1300	.....	.....	.....	.....	.....	1000-1600	.....	1450	.....	.....
34x5	Rear	1000	.....	1000	1000	Over 1000	Over 1000	.....	1300	.....	1000	900
	Front	1400	.....	1250	1250	Over 1000	Over 1000	.....	1600	.....	1000	1150
35x5	Rear	1000	.....	.....	.....	Over 1000	Over 1000	.....	1300	1000	.....	.....
	Front	1400	.....	.....	.....	Over 1000	Over 1000	.....	1600	1250	.....	.....
36x5	Rear	1300	.....	1100	1100	Over 1000	Over 1000	1200-1600	1300	1000	1000	900
	Front	1600	.....	1375	1375	Over 1000	Over 1000	1200-1600	1600	1350	1000	1150
37x5	Rear	1300	.....	.....	.....	Over 1000	Over 1000	.....	.....	1100	1000	.....
	Front	1600	.....	.....	.....	Over 1000	Over 1000	.....	.....	1350	1000	.....
38x5½	Rear	1300	.....	.....	1350	.....	.....	1800-2000	.....	1200	.....	.....
	Front	1600	.....	.....	1600	.....	.....	1800-2000	.....	1450	.....	.....

*The maximum allowable weight is given for front tire and the minimum for the rear tire. † Fisk company figures with the car loaded with passengers



Grand Central Palace Show Brings Out New Car Points

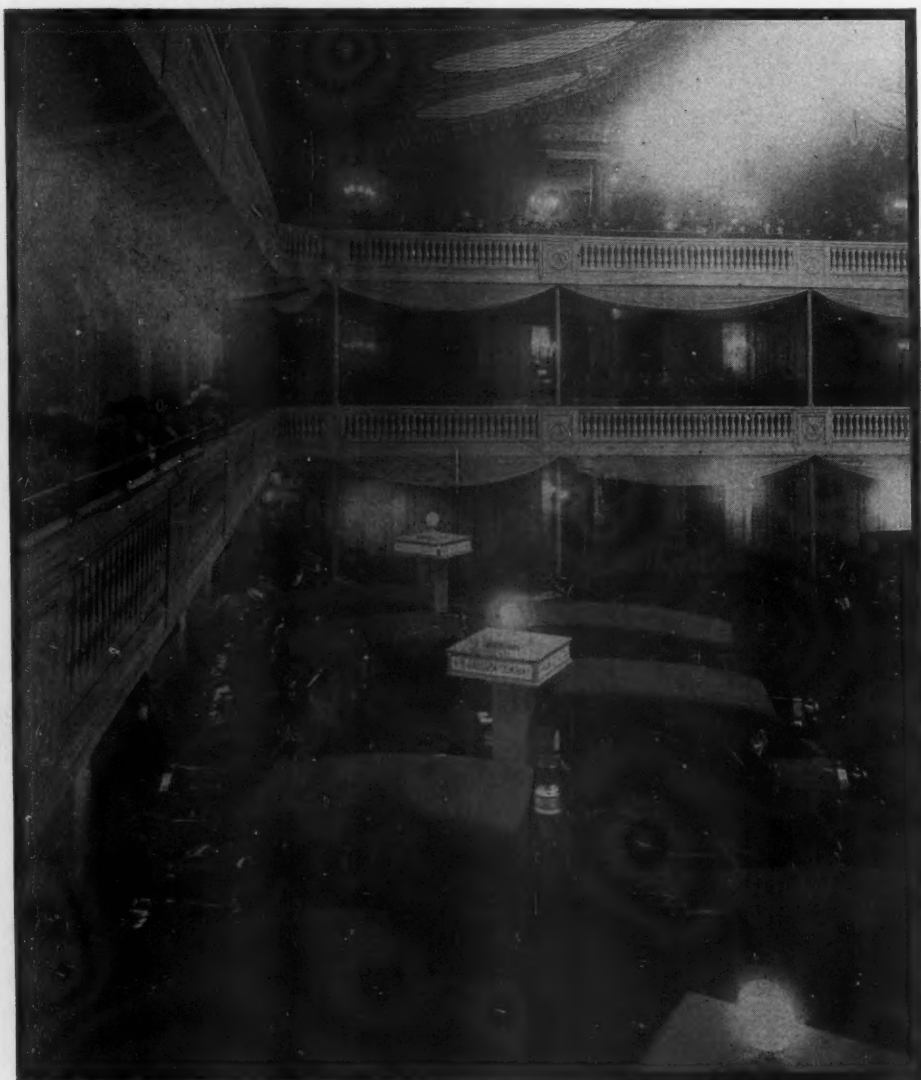
While Exhibitors in the New York Affair Are Not Strong Numerically They Display Products that Prove Progress of the Industry—Display of Motor Trucks a Good One

NEW YORK, Jan. 1—Despite the many counter attractions of New Year's eve the Grand Central palace was fairly well filled—in fact quite crowded before the evening was over—when the opening of the independent show, run under the auspices of the American Motor Car Manufacturers' Exhibit Association, took place last night. It was a restless, curious crowd that gaped with wide open eyes at the aeroplanes, in which it had a morbid curiosity because of the fatalities of yesterday afternoon, which resulted in the death of Hoxey and Moisant; that viewed with considerable admiration the display of motor trucks, while among the pleasure cars it seemed to feel perfectly at home—the latter were something with which it was more familiar than it was with the aeroplanes and trucks.

If the attendance last night is any criterion, the palace show will be a good

one from the box office standpoint. From the standpoint of the trade it may be somewhat different, for it must be admitted that the present exhibition hardly comes up to the standard set by the old A. M. C. M. A. under the leadership of Al Reeves. There were on view last night when the doors opened models representing thirty-seven different makes of pleasure cars, while there were twenty-four concerns showing trucks and commercial wagons. As for the exhibitors of accessories they made only a mere handful, hardly enough of them to warrant classification.

While the show lacks numerical strength from an exhibitor's standpoint, yet there is considerable merit attached to it in that the concerns which are showing are those which realize the importance of getting before the metropolitan audience, and take this method of doing it because of



LOOKING TOWARDS ENTRANCE TO MAIN HALL OF PALACE

PALACE SHOW EXHIBITORS

PLEASURE CARS

Abbott Motor Co.....Detroit, Mich.
Alpena Motor Car Co.....Alpena, Mich.
H. H. Babcock Co.....Watertown, N. Y.
Louis J. Bergdoll Motor Car Co.....
.....Philadelphia, Pa.
C. S. Baeder, Lexington Car.....
.....New York
Carter Motor Car Corporation.....
.....Washington, D. C.
Clark-Norwalk Co.....Brooklyn, N. Y.
Colt-Stratton Co., Cole.....New York
Columbus Buggy Co.....Columbus, O.
Correja Motor Car Co.....New York
Crawford Automobile Co.....
.....Hagerstown, Md.
J. M. Cunningham & Son Co.....
.....Rochester, N. Y.
Richard B. Darre, Cyklonette.....
.....New York
De Tangle Motors Co.....Anderson, Ind.
Gaylord Motor Car Co.....Gaylord, Mich.
Grays Motor Car Co., Schacht.....
.....Newark, N. J.
Henry Motor Car Sales Co., Henry
.....Chicago
Imperial Auto Co.....Jackson, Mich.
Johnson Service Co.....Milwaukee, Wis.
C. W. Kelsey Mfg. Co.....
.....Hartford, Conn.
Krit Motor Car Co.....Detroit, Mich.
LaDue-Carmer Co., Auburn.....New York
Lion Motor Car Co.....Adrian, Mich.
McFarlan Motor Car Co.....
.....Connersville, Ind.
Metz Co.....Waltham, Mass.
Michigan Buggy Co.....Kalamazoo, Mich.
Only Car Co.....New York
Otto Motor Car Co. of New York,
Otto.....New York
Palge-Detroit Auto Co.....Detroit, Mich.
W. A. Paterson Co.....Flint, Mich.
Penn. Motor Car Co.....Pittsburg, Pa.
J. M. Quinby & Co., Isotta.....
.....Newark, N. J.
Spencer-Liano-Briner Co., Petrel
.....New York
Velle Motor Vehicle Co.....Moline, Ill.
Warren Motor Car Co.....Detroit, Mich.
Whiting Motor Car Co.....Flint, Mich.

COMMERCIAL CARS

American Motor Truck Co.....
.....Detroit, Mich.
American Motor Truck Co.....
.....Lockport, N. Y.
Atterbury Motor Car Co.....Buffalo, N. Y.
Beyster-Detroit Motor Car Co.....
.....Detroit, Mich.
Cass Motor Truck Co.....
.....Port Huron, Mich.
Chase Motor Truck Co.....
.....Syracuse, N. Y.
Chicago Pneumatic Tool Co.....Chicago
Cortland Motor Wagon Co.....
.....Cortland, N. Y.

the fact the other show is an A. L. A. M. affair and necessarily confined to members of the Selden organization. Probably the list of exhibitors at the palace would have been a much larger one had it not been for the edict that went forth regarding the Chicago show, said edict being in effect that those which took part in an unsanctioned show such as is the palace affair could not get in at Chicago either this year or next. This undoubtedly caused the withdrawal of several companies which already had taken space in the palace, while others, fearful of being shut out at Chicago, are represented here by agents. Whether or not the N. A. A. M. will hold that this is a violation of its decree and drop the bars at Chicago on such concerns that are in the palace in this manner remains to be seen.

There seems to be considerable misunderstanding on the part of some as regards the refusal of both the National Association of Automobile Manufacturers and the Motor Accessories Manufacturers

Another Association of Car Makers Is Contemplated

PALACE SHOW EXHIBITORS

Otto Motor Car Co. of New York,
Crown New York
Findlay Motor Co. Findlay, Ohio
Flanagan Motor Car Co., Monitor,
..... Brooklyn, N. Y.
Geneva Wagon Co. Geneva, N. Y.
Gramm Motor Car Co.
..... Bowling Green, Ohio
Hartmann Sales Agency, Hart-
Kraft York, Pa.
International Harvester Co. of
America Philadelphia, Pa.
Johnson Service Co. Milwaukee, Wis.
Martin Carriage Works York, Pa.
New Haven Truck and Auto
Works, Moeller, New Haven, Conn.
Albert T. Otto, Saurer New York
Oliver Motor Car Co. Detroit, Mich.
Penn-Unit Car Co. Allentown, Pa.
West Side Garage & Motor Co.,
Seitz New York
Victor Motor Truck Co. Buffalo, N. Y.

ACCESSORIES

American Pedal Co. New York
Automobile Horn Co. Brooklyn, N. Y.
Auto Necessities Co. New York
Auto Utilities New York
Auto Wind Deflector Co.
..... Brooklyn, N. Y.
Behringer Radiator Co.
..... Ticonderoga, N. Y.
B. E. Mfg. Co. New York
Bristol Co. Waterbury, Conn.
C. A. Buffington Berkshire, N. Y.
Bushey Demountable Rim Co.
..... New York
Calmon Asbestos and Rubber Works
of America New York
Fabrikoid Works Newburgh, N. Y.
Economy Tread Co. New York
F-Z-H Parts Co. Chicago
John F. Galvin, Long Island City, N. Y.
A. H. Green & Co. New York
Hartford Rubber Works Co.
..... Hartford, Conn.
A. H. Kasper New York
K-W Ignition Co. Cleveland, Ohio
Morgan Co. New York
A. J. Myers, Inc. New York
Wm. C. Myron New York
New Process Vulcanizer Co.
..... Toledo, O.
New York Coil Co. New York
John W. Rapp Co. New York
Rector Engineering Co. New York
Ross-Heaton Mfg. Co. Richmond, Va.
Safety Tire Co. New York
Standard Metal Work Co.
..... Thompsonville, Conn.
Sterling Machine and Stamp Co.
..... Wellington, Ohio
William R. Winn New York

Meeting Is Called for the Purpose of Organizing Independents Who Hereafter Will Manage Their Own Expositions in Manhattan—Features of the New Year's Product

promoters, and that if there is anything doing in this line another year that it will be the independent tradesmen who will be at the head of affairs.

With this idea in mind a call has been issued for a meeting to be held next Thursday at the Manhattan to form the United States Motor Vehicle Manufacturers' Association. The call is signed by Thomas Aldcorn, of the Chicago Pneumatic Tool Co., maker of motor trucks at Franklin, Pa.; Carl F. Johnson, of the Johnson Service Co., of Milwaukee, and C. W. Kelsey of the C. W. Kelsey Mfg. Co., of Hartford, Conn. Frank Harvey Field is counsel for the proposed organization. The initiation fee is set at \$250, with annual dues of the same amount. This is somewhat different from the old American Motor Car Manufacturers' Association, which charged no initiation fee and made the dues \$500 a year. It is said that if the

United States Motor Vehicle Association is formed that in the future it will do its own show promoting in New York city.

Getting back to the present show, one must admire the promptness with which the exhibitors prepared for the display. Early yesterday morning they started getting into line, and when the doors were opened last night there were few who had not taken possession of their claims. In the pleasure car section the absentees which had not officially scratched included the Roder, Scioto and Van, while those which had declared themselves out were the Falcar, Carhartt and Black Crow. The Carhartt is holding a private show on the outside. Spaces in the commercial section which were vacant were the ones assigned to the Coleman Motor Truck Co., Ideal Motor Car Co., of Detroit; the Maytag-Mason Motor Co. and the Owosso Motor Co.

to sanction the palace show, but it is asserted by those who ought to know that there is no animus back of it. It is claimed that had the palace show been promoted by an association of manufacturers and not private promoters, as is the case now, that undoubtedly both the N. A. A. M. and the M. A. M. would have been glad to have granted sanctions. But it is pointed out that all the profits of the present show will go to individuals and not be split up among the exhibitors, as was the case in previous palace shows, and that therefore the controlling organizations could not see their way clear to giving the palace free rein.

It is more than probable that such will not be the case if any more shows are held in the palace. Indeed those independent makers who like to get before a New York audience are already taking time by the forelock and preparing for the 1912 show by laying the groundwork for an independent organization. It is stated that this will be the last effort of the present



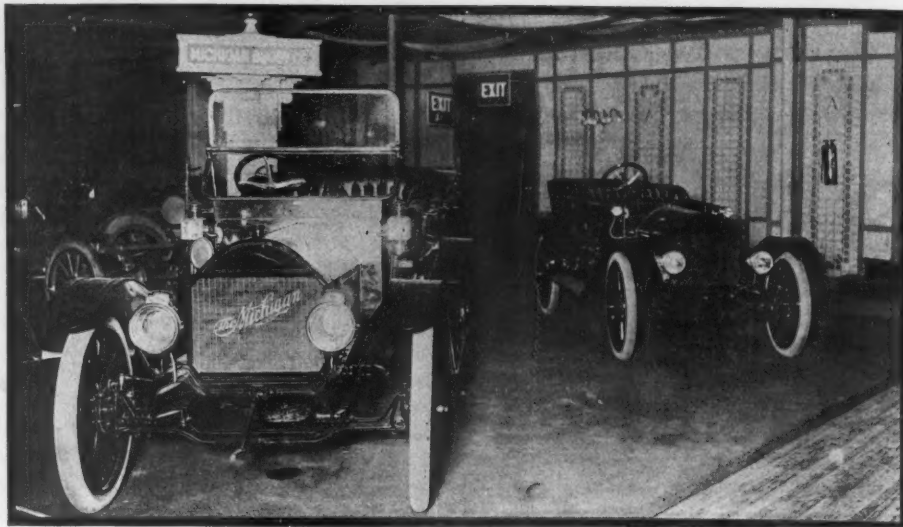
VIEW OF MAIN FLOOR OF PALACE FROM ENTRANCE

Changes Made in the New Models by Manufacturers

As for the decorations they hardly are up to the standard of other years, but on the other hand they serve their purpose well. The big building looks attractive and clean and the displays are well made. A good band is in attendance and enlivens the evenings and holds the interest of the crowds. On the main floor are the pleasure cars, and in the main aisle leading to the stage are the Isotta, Velie, Cole and Metz on one side and on the other the Michigan, Johnson, Babcock and Imperial. The other pleasure cars are scattered in the wings, so to speak. On the second floor are grouped the commercial cars, some aeroplanes and a few of the accessories people, while on the third floor are more aeroplanes and more sundries exhibits.

Looking over the show for tendencies one cannot help but notice that the trend is for fore-door bodies. Indeed there hardly is a pleasure car booth in which a body of this type is not found. Larger tires than ever before seem to be popular, and there seems to be few radical departures from the conventional in the way of body designs. The Velie people have a particularly attractive looking roadster, which is designed for speed purposes, while the Abbott-Detroit's coupe body is sufficiently out of the ordinary to attract considerable attention. The Krit has a runabout with an underslung frame and a torpedo body that catches and holds the attention of the public, while a feature on the seven-passenger Johnson, which is prominent because of its originality, is the lighting scheme. The side lamps are electric and are sunk in the dash, being flush with the wood in front, and the bulging back being hidden by the fore-door body. It is the intention to follow the same idea as regards the tail light, but this has not been done as yet. Electric lighting seems popular even for headlights, and several concerns, including one or two commercial people, rely solely upon this method.

Another tendency seems to be a disposition to make popular the combination car, one that can be used both for business and pleasure. The Penn is one of these, and has chassis which takes any one of three bodies—a touring car, roadster or light commercial wagon—which is made possible by a clever device on the steering column, which permits it being raised or lowered to get the desired rake. The Paige-Detroit, which started out making a three-cylinder two-cycle motor, has added to its line by producing a four-cycle four-cylinder as a running mate. The Atterbury has something good in the way of a folding starting crank which possesses considerable merit. The Cunningham encloses its valves and rocker arms and claims it is the first to do so with a motor having valves in the head. Two novelties in the way of three-wheelers are the Kelsey motorette and the Cyklonette.



MICHIGAN OCCUPIES PROMINENT SPACE IN MAIN HALL

ABBOTT-DETROIT—There is much refinement in the details in the new Abbott-Detroit cars. The valve cages of the motor are of heavier construction, so that they cannot be sprung when handled by inexperienced operators. Valve tappets are ground to obtain a more accurate fit in the guides and improve the wearing qualities and more silent operation. The overflows of the circulating lubrication system are enlarged so that an excess of oil in the splash chambers is impossible. A vertical tube radiator of honeycomb pattern is employed, which improves its appearance, and for which a greater cooling efficiency is claimed. The flywheel is heavier, so that operation of the motor is smoother and greater flexibility obtained. The foot accelerator is designed so that it may be operated while the entire portion of the foot rests on the floor board. The cutout is provided with a locking device, so that it may be secured in an open position. Adjustable Timken roller bearings are provided in the rear axles instead of adjustable ball. An I-beam drop forged steel axle replaces the manganese bronze one previously employed, and an adjustable ball bearing is used at the lower end of the steering knuckle instead of a plain bearing.

Alpena—The Alpena, made by the Alpena Motor Car Co., of Alpena, Mich., is a newcomer and is made in four models, all carried on the same chassis, which is equipped with a four-cylinder motor with the cylinders cast in pairs, the bore being 4 inches and the stroke $4\frac{1}{2}$. There is a unit power plant. The three suspensions of this unit are in the form of trunnions. One trunnion is at the front resting on the front cross member of the car and the two trunnions at the rear rest on bearings secured to the side members. Other features of the car are multiple-disk clutch, combination force feed and gravity system of lubrication, a pump water

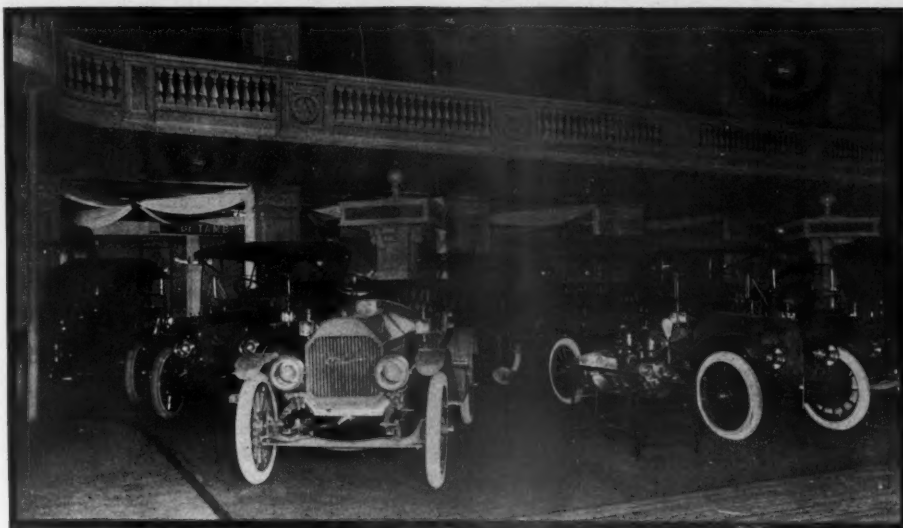
system and a selective sliding gearset. The wheelbase is 112 inches, shaft drive is employed and the wheels are 34 inches in diameter.

Auburn—The Auburn, made by the Auburn Automobile Co., of Auburn, Ind., shows a wheelbase increased from 116 to 120 inches. A cone clutch has been substituted for a disk, while three-quarter elliptic instead of elliptic springs are used. The Auburn people continue to use in their big car their $4\frac{1}{2}$ by 5-inch motor, which they manufacture themselves. They also have a 30-horsepower model with a 4 by 4-inch motor of Rutenber design, but they are pushing the larger car. The body fashions run in a five-passenger fore-door, five-passenger touring car, and a four-passenger close-coupled in the larger model and the same thing in the 30-horsepower line.

Babcock—Besides showing a commercial proposition, the H. H. Babcock Co., of Watertown, N. Y., has a line of pleasure cars. It offers two motors, one $4\frac{1}{2}$ by 5-inch and the other $4\frac{1}{4}$ by $5\frac{1}{4}$. The cylinders are cast in pairs and the valve heads are jacketed. Valve noise is cared for by means of $2\frac{1}{2}$ -inch valves, which lift only $\frac{1}{8}$ -inch for both exhaust and intake, while the cooling is secured by means of a positive gear-driven centrifugal pump. Splash lubrication is used. The clutch is a multiple-disk and the gearset selective. There are flat semi-elliptics in front and three-quarter elliptics in the rear.

Bergdoll—The L. J. Bergdoll Co., of Philadelphia comes to the show with nine styles of bodies carried on one chassis, and with a seating capacity ranging from two to seven. It is engined with a four-cylinder motor 4 by $4\frac{1}{2}$ inches, and ignition is secured by means of an Atwater Kent system and magneto. The clutch is a multiple-disk and the gearset is selective. The wheelbase is 115 inches. The Bergdoll company also turns out a taxicab

Exhibiting Latest Types of Cars in Grand Central Palace



IMPERIAL HAS A PROMINENT BOOTH IN MAIN HALL

model with a five-passenger capacity body.

Correja—With the Correja Motor Car Co., of New York, the idea takes the form of a runabout. The changes for 1911 show the adoption of a T motor for the Renault L-type formerly used. There has been an increase of power, and from a strictly runabout body the company has switched to one of the torpedo type. It also intends making toy tonneau and three-passenger bodies. The Correja motor has its four cylinders cast in pairs and having $4\frac{1}{4}$ bore and 5-inch stroke. The lubrication is had by means of a gear-driven pump connected with the camshaft and located on the left hand side. The ignition is high-tension magneto, which is located on the right hand side of the motor, although provision is made for a double system, taking in batteries, coil, commutator and two sets of spark plugs. The clutch is a cone and the carburetor is of the double-jet type. There is an electric light equipment, and the front lamps are set onto the hood of the dash.

Crawford—There are two chassis in the Crawford line, made by the Crawford Automobile Co., of Hagerstown, Md., and there are four models. Three of these are offered for the chassis, which carries the $4\frac{1}{4}$ by $4\frac{1}{2}$ -inch motor, a Continental, which uses splash lubrication, pump cooling and cone clutch. The wheelbase is 110 inches on the two roadsters and 112 on the touring car. The big touring car has a Crawford motor, which is $4\frac{1}{2}$ inches square. Again it is splash lubrication and the valves are operated by a single camshaft. The wheels are 34 by $3\frac{1}{2}$ and the wheelbase is 118 inches.

Cole—A year's experience has left the Cole company to add power and strength to its 1911 models. Using a three-point suspension, it has increased the cylinder dimensions from 4 by 4 to $4\frac{1}{4}$ by $4\frac{1}{2}$ inches. Besides it has tipped the motor $2\frac{1}{2}$ degrees with respect to the horizontal, and

it claims the horsepower has jumped from 30 to 36. L type cylinders cast in pairs are used. The wheelbase has been increased from 108 to 118 inches and 34 by 4-inch tires are used instead of 32 by $3\frac{1}{2}$. Demountable rims now are part of the equipment. The rear axle is of the full floating type and Hyatt roller bearings are installed. In the three-point suspension of the power plant, it is noted that the third or pivot point is at the front end of the motor and just under the crankcase. The other two supports are heavy aluminum arms, which are cast integral with the flywheel housing and rest on cast iron blocks inside the side rails of the main frame.

Cunningham—This show also marks the entrance of the Cunningham, made by James Cunningham, Son & Co., of Rochester, N. Y., into the selling field. These veteran carriage makers have produced a car in which the power plant is a feature. A unit construction combines the motor and transmission into one piece. The bore is $4\frac{3}{4}$ and the stroke $5\frac{3}{4}$, while the large valves are set in cages in the cylinder head, the cylinders being offset. A feature is that this valve-in-the-head motor has the valves enclosed. The water cooling is effected by means of a gear-driven centrifugal pump, while the clutch is of the cone type. The lubricating system is circulating splash, while the wheelbase is 124 inches, with the springs semi-elliptic in front and elliptic in the rear. The wheels carry 36 by $4\frac{1}{2}$ -inch tires and demountable rims are fitted. The rear axle is a Timken full-floating one and the front I-beam section.

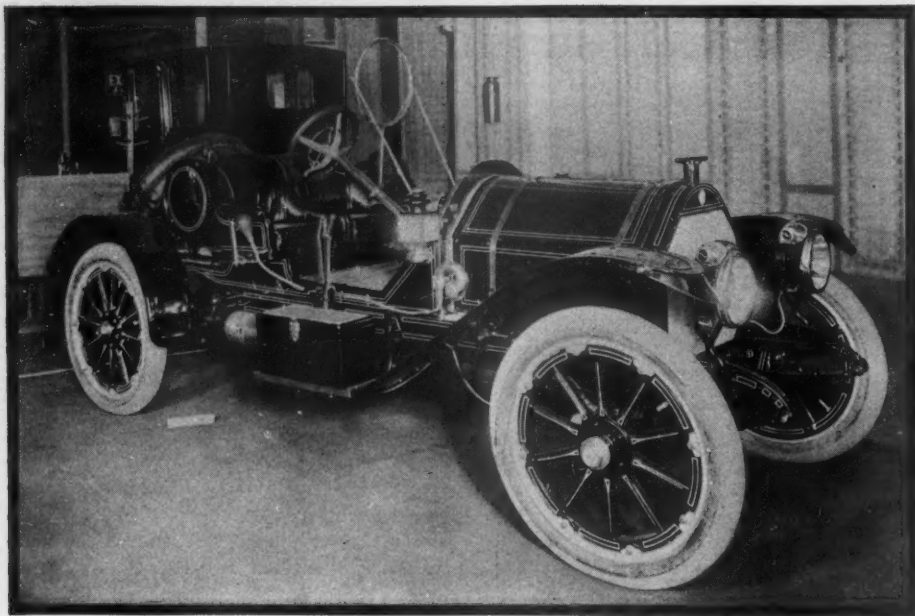
Clark—The Clark comes from Indiana—Shelbyville—and the concern making it has been in the industry for 6 years. The line includes three body styles on two chassis. Models A and B use the Rutenber motor, with four individually-cast cylinders, rated at 30 horsepower. This chassis has a multiple-disk clutch, pump circulation in the

water system, high-tension magneto and 34 by $3\frac{1}{2}$ wheels on A and B. The wheelbase is 114 inches. The model X has a motor with the cylinders cast en bloc and using a self-contained oiling system, the bore being 4 inches and the stroke $4\frac{1}{2}$. There is a three-bearing crankshaft. With the exception of the motor and the wheels the X has the same general specifications as in model A.

De Tamble—The De Tamble Motors Co., of Anderson, Ind., comes to the show with almost a new line—at least everything is new in the four-cylinder group, although the company has carried over its two-cylinder three-passenger runabout which it put out last season. Four models are offered as four-cylinders, the features being an engine with a bore of $4\frac{3}{8}$ inches and a stroke of $4\frac{1}{2}$; three-speed selective gearset, shaft drive, disk clutch and full floating rear axle. In model K there is a 120-inch wheelbase and 36-inch wheels. Model I has 115-inch and 34-inch wheels, and so have the other three models in this line. The De Tamble cooling system takes in a centrifugal force pump and tubular radiator, while the dual system of ignition is fitted.

Firestone - Columbus—The Columbus Buggy Co. has four models, which are offered on three chassis. The fore-door five-passenger car has an engine rated at 32 horsepower and a wheelbase of 113 inches. It employs dual ignition and uses a cone clutch, a sliding selective gearset and 34 by $3\frac{1}{2}$ -inch wheels. The five-passenger family car has a $4\frac{1}{2}$ by 5-inch four-cylinder motor, which is rated at 42 horsepower, and which has a wheelbase of 120 inches. Ignition system is a double one, employing an Atwater Kent distributor and a high-tension magneto. In most other details it is the same as the fore-door type. The coupe carries a 24-horsepower motor, has a wheelbase of 106 inches and 32 by $3\frac{1}{4}$ -inch wheels. The roadster has the same wheelbase and wheel sizes, but the rating of the motor is 26 instead of 24. The 66C model is the same as the 6C, the five-passenger family car, with the exception of the design of the body and position of the driveshaft and control levers. The shaft in this model is on the left-hand side. The emergency brake and gear levers are in the center of the car and to the right of the driver. The limousine has left-hand steer, center control levers and high doors in front.

Gaylord—The Gaylord Motor Car Co., of Gaylord, Mich., has brought out a utility car which is converted from a pleasure rig into a delivery vehicle capable of carrying from 1,000 to 1,200 pounds of merchandise by removing the rear seat, which carries the top with it. Four models are offered on three chassis. The Gaylord utility uses a 4 by 5 motor; the demi-tonneau a 4 by $4\frac{1}{2}$; the roadster $3\frac{3}{4}$ by $4\frac{1}{2}$; while the



RACY TYPE ROADSTER SHOWN BY VELIE COMPANY

Gaylord special also uses a 4 by 5 inch. The Gaylord utility and Gaylord special models have wheelbases of 112 inches, while on the others the wheelbase is 106. All models but the special use 32 by 3½ inch tires, the special having 36-inch. The delivery body has a carrying space back of the front seat of 31 by 66½ inches, while the sideboards are 7½ inches high.

Henry—Two new models, designated K and B, are added to the Henry line. As for the changes in the models which are continued from 1910, a Rayfield carbureter has been fitted to the motor, the rear axle is provided with a truss rod, and larger bearings with a large bevel driving gear. And a larger and more roomy body is fitted. The Henry motor on the 40-horsepower model is of the L-head type, with the valves all on one side, and the bore and stroke 4½ by 5¼. The lubrication is by means of a circulating inside pump, which is spiral-geardriven, with pressure feed through the crankshaft. The pump idea also is utilized in the cooling system. Besides this, the other engine is of the en bloc type, 3¾ by 4½. The company lists a variety of bodies, including a rakish looking roadster, fore-door touring car and five-passenger touring car.

Imperial—The Imperial company, a Michigan concern, gives the public its choice of bodies and offers one chassis, which carries a four-cylinder motor 4¼ by 4½, which is rated at 25-30 horsepower. The magneto and dry cells furnish the ignition, while the clutch is of the cone type, the gearset selective and the final drive shaft. Another chassis is rated at 30-35 horsepower, and has an engine with a bore and stroke of 4¾ by 5½. It is on this chassis that the company offers its fore-door car. In general details it greatly resembles the smaller model. In addition to the fore-door this chassis carries a roadster, or a touring car body.

Isotta—The only foreign car on view in

the show is the Italian Isotta, which is displayed by J. M. Quimby & Co., who long have manufactured bodies for the motor trade. This foreign car occupies a prominent place on the main floor and is shown in a variety of models, all of which illustrate the latest idea in foreign practice.

Johnson—Besides commercial cars the Johnson Service Co., of Milwaukee, makes pleasure cars, which are much in evidence at the show. One of the big talking points is the Johnson-Bosch ignition system, which is new in that Johnson has incorporated with the Bosch magneto an accelerator device, which is placed on the magneto to facilitate starting. There are larger water vanes in the circulating pump, and the carbureter now is placed on the valve side, while the manifold has been raised for the sake of valve accessibility. Cycloidal gears for running the camshaft and pumpshaft tend to make the motor a quiet one. The Johnson electrical lighting system, which includes the headlights, is featured by the side lights being incorporated with the dash, being flush with it in front, while the rear of the lamp is somewhat hidden by the fore-door construction. This is used only on the seven-passenger car. The Johnson people have three motors, one, a 30-horsepower, having a bore and stroke of 4¼ by 4½; a second, a 40, a 4½ by 5¼, and the third, a 50, having 5 by 5½.

Kelsey—Something new is the Kelsey three-wheeled motorette, made by the C. W. Kelsey Mfg. Co., of Hartford, Conn. The motorette has two front wheels, which are used for steering, while the single rear wheel is the driver. The springs and framework converge at the rear, giving a rough triangular shape to the car. The object of this motorette is to furnish a light vehicle satisfactory for two passengers, and its construction eliminates the rear axle, differential, driveshafts and housing. The power plant is a two-cylinder opposed motor mounted under the seat

with standard four-cycle construction with jump spark ignition and an oiling system in which the oil is delivered direct to the two bearings in the crankshaft and the two cylinders. From these it flows into the crankcase, whence it overflows into the oil reservoir under the base of the case. Once in this reservoir it is filtered and forced back to be ready for recirculation. The motorette weighs, complete, 475 pounds.

Krit—A feature of the show is a runabout with the underslung frame, which is shown by the Krit Motor Car Co., of Detroit. This runabout is fitted with a deep torpedo-type body and the rakish effect sought for by the designer has been secured. The Krit people use the one chassis, which has a four-cylinder motor with a 3¾-inch bore and 4-inch stroke, relying solely on a magneto for ignition. The clutch is a multiple-disk and the gearset selective, while shaft drive is utilized. The wheelbase of the Krit is 96 inches and the wheels are 32 by 3.

Lion—Refinement in details marks the Lion, made in Adrian, Mich. This year the car is sold fully equipped and in addition has a larger radiator, heavy fenders, a change in springing and a new model with a fore-door type of body. Four models are offered for the one chassis, and the company is proud of the fact it builds its own motor and gearset, the motor being a 4½ by 5-inch affair and the wheelbase 112 inches. The wheels carry 36 by 3½-inch tires. The motor, gearset and clutch, including the flywheel, are carried in a continuous aluminum case. An accessibility feature is that by removing a plate that runs the entire length of the engine on the right side, the camshaft and bearings, together with the taplets and guides, come away with the plate. The one-piece power plant is mounted on a sub-frame. There is a cone clutch, dual ignition system and splash lubrication.

McFarlan—The McFarlan Motor Car Co., of Connersville, Ind., was so well satisfied with its little six last year that it has added a 50-60-horsepower model to this year's line, there being seven different body types for the two chassis. No startling changes are to be found, about the only change of importance being to put the flywheel in the rear of the engine and enclose it in the gearset case. Each of the six-cylinder motors is of the valve-in-the-head type, the little six having a bore of 3⅝ inches and a bore of 4, whereas the new and larger one is 4 by 5 and with 2-inch valves. In most other details the two chassis greatly resemble each other. The clutch is a multiple-disk, the gearset three-speed selective, dual system of ignition and force feed lubrication. On the little six the wheelbase is 120 inches and on the big six it is 128 inches.

Michigan—With the exception of model B the line of the Michigan Buggy Co. is new, there being three additions to the line. There are two chassis, which are shown for the first time, the cylinders of

the motor being cast singly and bolted together, giving an en bloc effect. The motor on the old model is a Hazard and on it the cylinders are cast in pairs. There is a multiple-disk clutch and the gearbox on the newcomers is placed amidships.

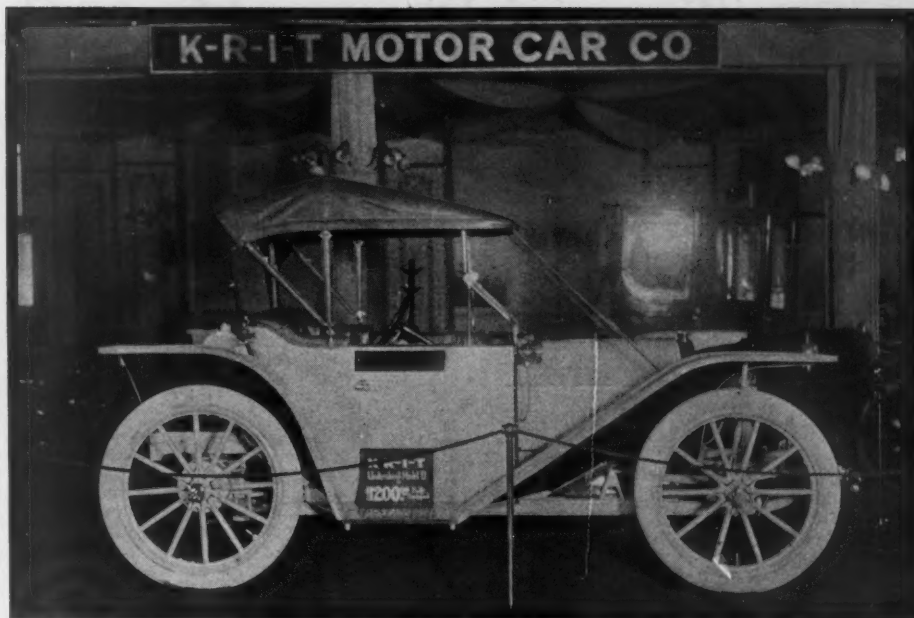
Metz—The Metz company has abandoned the idea of shipping parts to the purchaser and allowing him to assemble his own car and for 1911 it is turning out a complete two-passenger car, which is marketed exclusively through the dealers. Like several other machines in the show, the Metz can be used for pleasure as well as business, it being possible to mount a large cylindrical parcel carrier in the rear, in which packages may be carried. The Metz carries the two-cylinder opposed motor mounted transversely in front and driving through a long shaft, which carries on its rear a friction disk, the drive from the jackshaft is by side chains to the rear wheels. The wheelbase is 81 inches and the tread 48 or 56, as desired.

Norwalk—The Norwalk, made by the Norwalk Motor Car Co., of Norwalk, O., stands out as an example of three-point suspension, which includes the motor clutch and gearbox. Two of these points of suspension are permanent on the radiator support, while the third is on a bearing. The motor is of the valve-in-the-head type, with the exhausts located in the cylinder heads and the intakes in side pockets, the bore and stroke being 4 by 5 inches and the cylinders individually cast. There is splash lubrication and a dual system of ignition. The wheelbase is 117 inches and the wheels 36 by 3½. The gasoline tank is carried in the rear under the frame. The clutch is of the cone type and there is a full floating rear axle.

Otto—In the Otto, the Philadelphia-made car, there has been substituted a full floating rear axle in place of the live type one used last year. The spokes in the rear wheels have been bossed, while larger brake drums are used. There is a universal case to the housing and the differential are one-piece and of manganese bronze. The old motor is retained and the two chassis are represented in nine different models.

Only—The Only car is a new one at the shows, a one-cylinder proposition which made its debut in a contest way last summer. The car has a wheelbase of 104 inches and the motor is placed under the hood, which is long enough to give the car the appearance of a four-cylinder. The bore is 5½ by 10 inches, the horsepower rating being 12. The carbureter is of the three-jet type; thermo-syphon cooling is used and there are two systems of ignition. The oiling is had by a mechanical system and the transmission is of the selective type. A cone clutch and shaft drive are other features, while the tires are 29 by 3½. The car comes in roadster form only.

Penn—It is argued by a newcomer, the Penn Motor Car Co., of Pittsburg, that there



KRIT WITH UNDERSLUNG FRAME ONE OF THE NOVELTIES

is a demand for a motor vehicle that can be used for both business and pleasure purposes. This belief has resulted in the production of the Penn chassis, which carries interchangeable bodies. It will take either a roadster or touring car body or else a light delivery body can be put on. To get the desired rake to the steering column there is a plate arrangement at its base, which enables it to be either raised or lowered, as may be demanded. The plate has four corrugated slots and four corrugated bolts engage when the right tilt has been secured. The motor on the Penn is a four-cylinder en bloc, with the valves on one side and enclosed. The motor develops 30 horsepower. It has a 105-inch wheelbase, selective gearset, cone clutch, dual ignition and pump lubrication.

Paige-Detroit—Whereas the Paige-Detroit pinned all its faith last year to a three-cylinder two-cycle proposition, for 1911 the Detroit makers have added to their line a four-cylinder four-cycle motored chassis in which the bore is 3¾ inches and the stroke 4, the same size as the three-cylinder. In the body line the offering includes a fore-door, a roadster and a coupe, while the three-cylinder carries either a roadster or a coupe body. Mechanical features include a unit power plant, a multiple-disk clutch and selective gearset.

Paterson—A fore-door idea represents the latest in the line of the W. A. Paterson Co., of Flint, Mich., which this year is making models E and I, with a 4 by 4 motor and a wheelbase increased from 106 to 110 inches, and models G and H, engined with a 4¼ by 4½-inch motor and with a wheelbase of 118 inches. A variety of body styles is offered. The G and H represent the latest thought at the factory, among the mechanical features being the unit power plant, a cone clutch, thermo-syphon water cooling and splash lubrication.

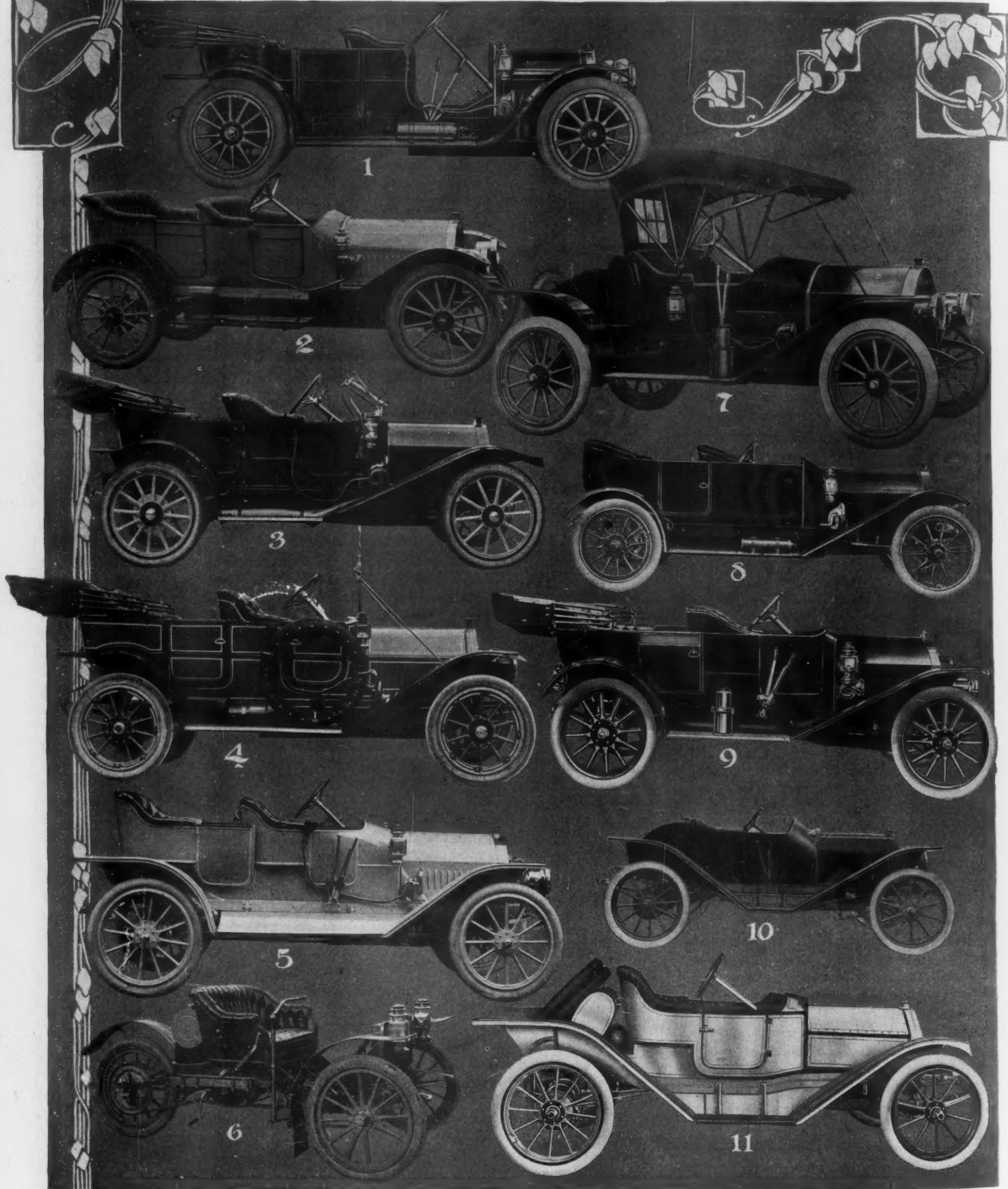
Petrel—The Petrel is one of the few examples at the show of friction drive,

and the company has added three new chassis to the one that was made last year, which gives it a wide range—one motored 3¾ by 4½; two others at 4¾ by 4¾ and a fourth at 4¾ by 5¼. The body styles five, a wide range of choice, and altogether the display is a most creditable one.

Schacht—This is the first year for the four-cylinder Schacht, made by the Cincinnati concern, which entered the motor industry originally with a motor buggy. The company carries over its two-cylinder model, which has been refined and improved in detail. The four-cylinder proposition has a bore of 4⅞ inches and a 5-inch stroke, and the 2-inch valves are placed at the side. The clutch is a cone and splash lubrication is employed, operated by a plunger pump. Magneto ignition is utilized and the wheelbase is 120 inches on the touring car and 110 on the roadster. The rear axle is semi-floating and the front an I-beam section single-piece drop forging.

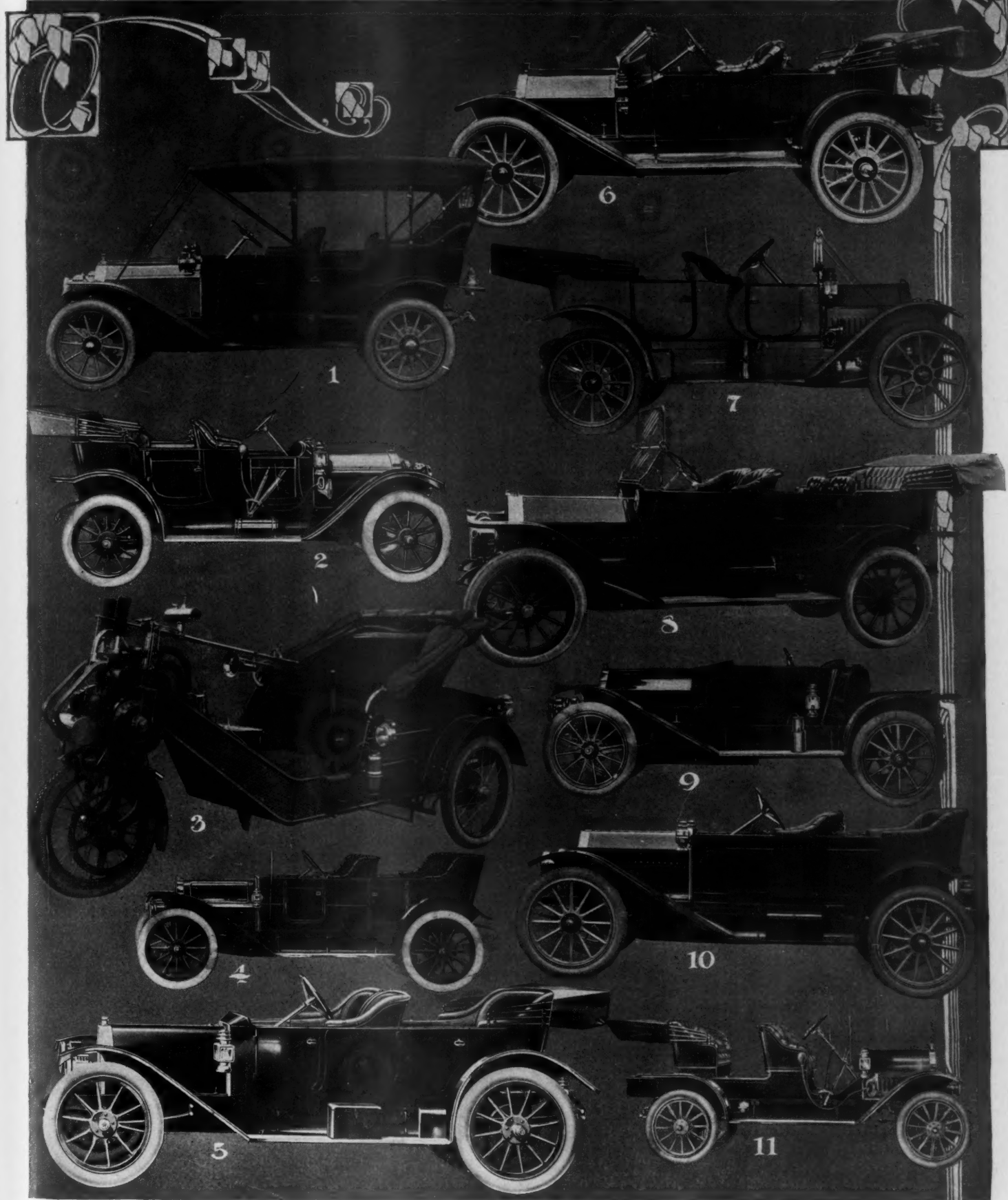
Warren-Detroit—Among the changes in the Warren-Detroit, the engine gears are now of a helical or spiral design, instead of the plain spur type. A Bosch magneto is a feature of the double ignition system. The top of the radiator on the torpedo models is more rounding and graceful in design, and a heavier gearset is used in which the gears have ¼-inch wider face. Quick-detachable universal rims are fitted to the wheels in place of plain clinchers. The Warren-Detroit motor remains the same—a four-cylinder of 4 by 4½-inch bore and stroke, and with the valves all on one side. It is of the en bloc type. The clutch is a cone and pump circulation is maintained in the cooling system. The Warren-Detroit people also have invaded the commercial realm with a light delivery car, which is fitted with a panel body with an inside width of 43 inches, a length back of the seat of 60

Types of Pleasure Motor Cars Exhibited in the



1—Cole touring car; 2—Warren-Detroit fore-door toy tonneau; 3—Abbott-Detroit's fore-door body; 4—Velle has a fore-door type; 5—Patterson's fore-door with shrouded hood; 6—The new Kelsey Motorette; 7—Cole roadster for two passengers; 8—De Tamble's torpedo with fore-door embellishment; 9—Fore-door body on Alpena Flyer; 10—Correja with torpedo type roadster body; 11—Firestone-Columbus two-passenger roadster with fore-door body

Grand Central Palace Show, New York City



1—Lexington touring car using fore-door idea; 2—Babcock touring car, a new comer; 3—The Cykionette, four and three-wheeler; 4—DeTamble as it looks in touring car form; 5—Firestone-Columbus touring car model; 6—Norwalk in its 1911 form; 7—As the Lion looks as a touring car; 8—Seven-passenger Johnson with side lights sunk in dash; 9—Torpedo Clark in two-passenger style; 10—Warren-Detroit touring car; 11—Gaylord used both for pleasure and business

inches and a height of 53 inches. The capacity of this wagon is 1,000 pounds. The car also is furnished with a winged express body, which is equipped with canvas top, roll sides and drop tail boards, which is designed to meet the needs of the business man who does an expressing or grocery business, for instance.

Washington—The Washington of the Carter Motor Car Corporation, of Washington, D. C., has a motor of $4\frac{1}{2}$ by $5\frac{1}{4}$, with the cylinders cast in pairs and with the valves all on one side. There is a gear-driven water pump and a self-contained oiling system, operated by a gear-driven pump. The clutch is a multiple-disk, and the wheelbase 118 inches. The body styles include a two-passenger roadster, a baby tonneau of the torpedo type and a touring car with double Dutch doors.

Velie—Changes in the Velie for 1911 have been in the nature of refinements instead of radical departures from the conventional. Although only one chassis is turned out, there are nine different body styles, including, of course, a fore-door. In the way of changes it is noticed that the mushroom tappets have been replaced with a hardened roller bearing pushrod of large diameter, tending to make the motor quieter. There also has been an improvement in the clutch in that cork inserts and springs between the engaging plates have been added in the effort to secure flexibility and ease of operation. The double ignition system employs the Atwater Kent generator and a magneto. The coils of both these systems are placed under the hood, so that the dash is clean save for a kick switch and oil sight feed. The fore-door equipment on the model of that type is detachable, while another body idea is found in the racytype roadster, which is equipped with a 40-gallon gravity feed gasoline tank and a 12-gallon oil tank located at the rear of the seats. The Velie motor is the same as used heretofore, having a bore of $4\frac{1}{2}$ inches and a stroke of $5\frac{1}{4}$ inches. The Velie Company also has a racytype roadster which looks fast and which is a new idea.

A. L. A. M. EVENTS

January 10—Meeting of executive committee of the American Automobile Association. The contest, good roads, legislative and touring boards will hold open sessions during the 2 weeks' period of the show.

January 11—Meeting of executive committee of the Association of Licensed Automobile Manufacturers at official headquarters, 7 East Forty-second street, New York.

January 11—Meeting of executive committee of National Association of Automobile Manufacturers.

January 11-12—Annual meeting of Society of Automobile Engineers at the Automobile Club of America. A dinner will be held during the session.

January 12—Meeting of board of managers of the Association of Licensed Automobile Manufacturers, at executive offices.

January 13—Annual meeting of the Motor and Accessory Manufacturers' Association. Annual dinner at Waldorf at night.

Offerings in the Commercial Realm

ATTERBURY—The Atterbury Motor Car Co., of Buffalo, gives the business world a wide range in choice in five chassis, which include a K 20, a four-cylinder 1500-pound delivery wagon; L 30, a four-cylinder $1\frac{1}{2}$ -ton; N 40, a 2-ton; M 50, a 3-ton and O 60, a 5-ton. Changes in the line take in the substitution of a Hele-Shaw for a cone clutch, a folding starting crank of merit, while on the N, M and O there is a special channel steel frame, wood being used on the other two. A neat lubrication idea is found in a special steel bolt in the spring shackles. The body styles take in everything and include a sixteen-passenger sightseeing car. The model O 60 has a four-cylinder vertical motor, with the cylinders cast separately and with $5\frac{1}{4}$ bore and 6-inch stroke. The gearset is selective sliding and a multiple-disk clutch is employed. The tread is 68 inches and there is double chain drive, with solid tires 36 by 5 in front and 36 by 4 duals in the rear. The weight is approximately 7200 pounds.

American of Detroit—Showing for the first time, the American Motor Truck Co., of Detroit, employs four-wheel drive and double steering in its 1, 2, 3, 5 and 10-ton trucks, which give it a wide range. On the 1 and 2-ton trucks the motor is a two-cylinder four-cycle with 5 and $5\frac{1}{2}$ -inch motors respectively. The 3-ton carries a four-cylinder $4\frac{1}{2}$ by 4, the 5-ton a four with $5\frac{1}{2}$ square, while it takes a four-cylinder $6\frac{1}{2}$ by 6 to operate the 10-ton. The gearset is planetary and there is single-chain drive to both front and rear axles. The motor being stationed central of the wheelbase, drive is had direct both ways, doing away with jackshafts and sliding gear transmission. The four wheels are interchangeable, as are the axles.

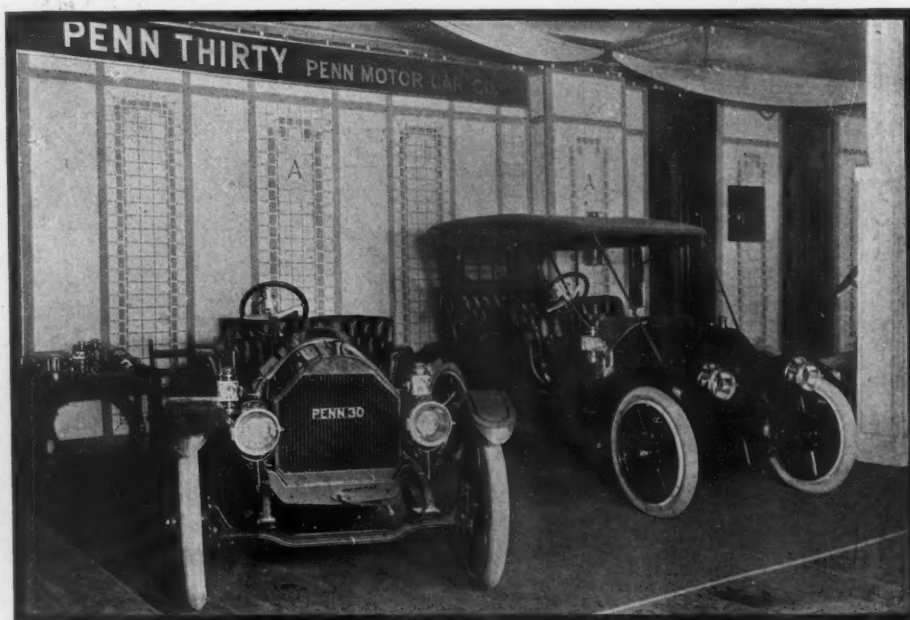
American of Lockport—The American

Motor Truck Co., of Lockport, N. Y., in business for 6 years, has three chassis of varying capacity: 2, $3\frac{1}{2}$ and 5-ton. Besides this it has a $3\frac{1}{2}$ -ton electric. The gasoline trucks are equipped with powerful motors, the 2-ton and the $3\frac{1}{2}$ each showing 45 horsepower by means of a four-cylinder engine with $4\frac{7}{8}$ -inch bore and $5\frac{1}{2}$ -inch stroke, while the 5-ton has 60 horsepower, the bore being $5\frac{1}{4}$ and the stroke 6 inches. On the 2 and $3\frac{1}{2}$ -ton trucks the engine has three-point suspension, as also has the transmission, while the 2-ton is equipped with 38 by $3\frac{1}{2}$ -inch solids in front and 42 by 4-inch solids in the rear.

Babcock—The Babcock's commercial car carries a two-cylinder horizontal water-cooled motor of 20 horsepower and is designed for light delivery purposes. It is of 1000-1500-pound capacity and has a wheelbase of 100 inches, carrying 34 by 3-inch solids both front and rear. Such features as multiple-disk clutch, force feed oiler, thermo-syphon cooling, magneto ignition and double chain drive are found. The panel body has a capacity of 38 by 84 inches, with a door back of the seat of 42 by 22 inches.

Beyster-Detroit—A talking point with the Beyster-Detroit, light delivery, is the electric lighting system which does away with oil lamps, there even being an incandescent to illuminate the interior of the panel bodies. The Beyster carries a 20-horsepower four-cylinder, has planetary gears, thermo-syphon cooling and side-chained drive. The wheels are 36-inch solids and there is a magneto with a reserve set of dry cells and a storage battery for lighting purposes.

Cortland—This is the first show for the Cortland Motor Wagon Co., of Cortland, N. Y., and it is improving the opportunity



PENN 30, A CAR BOTH FOR BUSINESS AND PLEASURE

As Seen in the Grand Central Show

to show a chassis with a 16-horsepower two-cylinder four-cycle motor, with a $4\frac{1}{4}$ -inch bore and stroke. There is shaft drive to the differential, and from there it is double chain to the rear wheels. A Muncie planetary gearset is used, and the firm supplies the motor either air or water-cooled. A mechanical feature of this chassis is the foot control, a clever device throwing out any speed that may be engaged when the clutch is applied. There are five body styles in light delivery rigs and station buses.

Crown—The Crown Commercial Car Co., of Milwaukee, showing through its New York agent, has a light delivery proposition which comes in five models and which is of 1,000-1,500-pound capacity. As is usual, the purchaser is given a wide range of choice in body styles.

Cass—The Cass Motor Truck Co., of Port Huron, Mich., is concentrating its efforts on the manufacture of a 1-ton truck which is equipped with a four-cylinder four-cycle water-cooled motor, and which has a sliding gear transmission, double side chain drive, and which offers five different types of bodies, all of which are interchangeable, on the same chassis. The motor, rated at 30 horsepower, has a bore and stroke of 4 by $4\frac{1}{2}$ inches and is cooled by the thermo-syphon system. Lubrication is by splash. The frame is 172 inches long and 36 inches wide and is made of pressed channel steel with the corners braced by steel gussets. The wheels carry 34 by 3 Diamond solids in front and 34 by 4 in the rear.

Chase—The Chase Motor Truck Co., of Syracuse, N. Y., has a new model of the surrey type as well as a model K 2,000-pound wagon, which uses a sliding gearset and a 4,000-pound machine. Another 2,000-pound wagon has a planetary gear-

set. Old models retained include the D, which has been made heavier, fitted with larger axles, heavier springs, a magneto and given more efficient brakes. The Chase continues its two-cycle three-cylinder valveless motor, which is air-cooled. The cooling being assisted by a turbine fan, which is cast integral with the fly-wheel. The lubrication is effected by mixing 1 quart of heavy engine oil to each 5 gallons of gasoline, the mixture passing through the carbureter and being carried in the cylinders along with the gasoline vapor in the form of a fine mist. This travels through the intake pipe to the engine, every exposed part being covered with a film of oil. The ignition system takes in an Atwater Kent unisparker and dry cells.

C. P. T.—The Chicago Pneumatic Tool Co. is marketing a 1,500-pound truck, which carries a two-cylinder engine $4\frac{1}{4}$ inches square and which is fitted with planetary gearset, multiple disk clutch and 36 by 2-inch solid tires. Chain drive is utilized and the wheelbase is 86 inches.

Ewing—The Findlay Motor Co., of Findlay, O., makes the Ewing, and a neat idea on a light delivery cart is the placing of the cylindrical gasoline tank back of the driver's seat and ahead of the loading space. This wagon has a capacity of from 500 to 750 pounds, uses shaft drive and has a wheelbase of 84 inches. There are 30-inch wheels fitted with pneumatics. The engine is a two-cylinder of $4\frac{3}{8}$ by $4\frac{3}{4}$ bore and stroke, using pump water circulation and selective gearset. The model A is larger, having a 1,000-pound load capacity. It uses a four-cylinder motor with $4\frac{3}{8}$ -inch bore and $4\frac{3}{4}$ -inch stroke, the motor being located in front. There is splash lubrication and the water system employs a centrifugal pump. There is a

single system of ignition employing a magneto, and the control is fixed. The clutch is a multiple-disk and the gearset selective sliding, drive being by chain.

Geneva—The Geneva Wagon Co., of Geneva, N. Y., is a newcomer and presents one chassis which will carry panel top delivery and express wagons, ambulances and wagonettes. Accessibility is the keynote, and the engine is mounted in front below the frame and bonneted. A magneto only is used for ignition purposes, and there is a planetary gearset. It is double side chains from the differential to the rear wheels, there being bevel drive forward. The wood frame is double trussed and reinforced with iron. The engine is a two-cylinder horizontal opposed, with $5\frac{1}{2}$ -inch bore and $4\frac{1}{2}$ -inch stroke. The wheelbase is 96 inches and the clutch disk. Solids 34 by 2 in front and 36 by $2\frac{1}{2}$ in the rear are fitted.

Gramm—As usual the Gramm Motor Car Co., of Lima, O., has a most comprehensive display, which covers a wide range of choice, its trucks being built of 1, 2, 3 and 5-ton capacity. The 1-ton has a four-cylinder en bloc motor of 4 by 5, the power plant being a unit system and the oiler self-contained in the motor. The clutch is multiple-disk and the cooling is thermo-syphon. The drive is by chain. and the weight is about 2800 pounds. The wheels are 34 by $3\frac{1}{2}$. The motor on the 2-ton truck also is a four, but the cylinders are cast in pairs and have a bore and stroke of $4\frac{1}{4}$ by $4\frac{1}{2}$ inches, the mechanically-operated valves being on one side. A gear-driven pump is found in the cooling system and the gearset is selective sliding. The clutch is a multiple-disk and the wheelbase 124 inches. The 3-ton motor has a bore of 5 by 5, a wheelbase of 124 inches and a tread of 66. This same motor is used on the 5-ton trucks and in general details it is about the same. The wheelbase, however, is 130 inches and the tread 69. A feature of the big truck is its four-speed gearset with direct drive on third. The front wheels are 36 by 5 and the rear have 40 by 5 duals. A brake detail is that by a special arrangement of the rear brake drums, by which the throwing of a lever from the seat puts into operation a catch on a set of dogs that will lock the wheels and hold the truck.

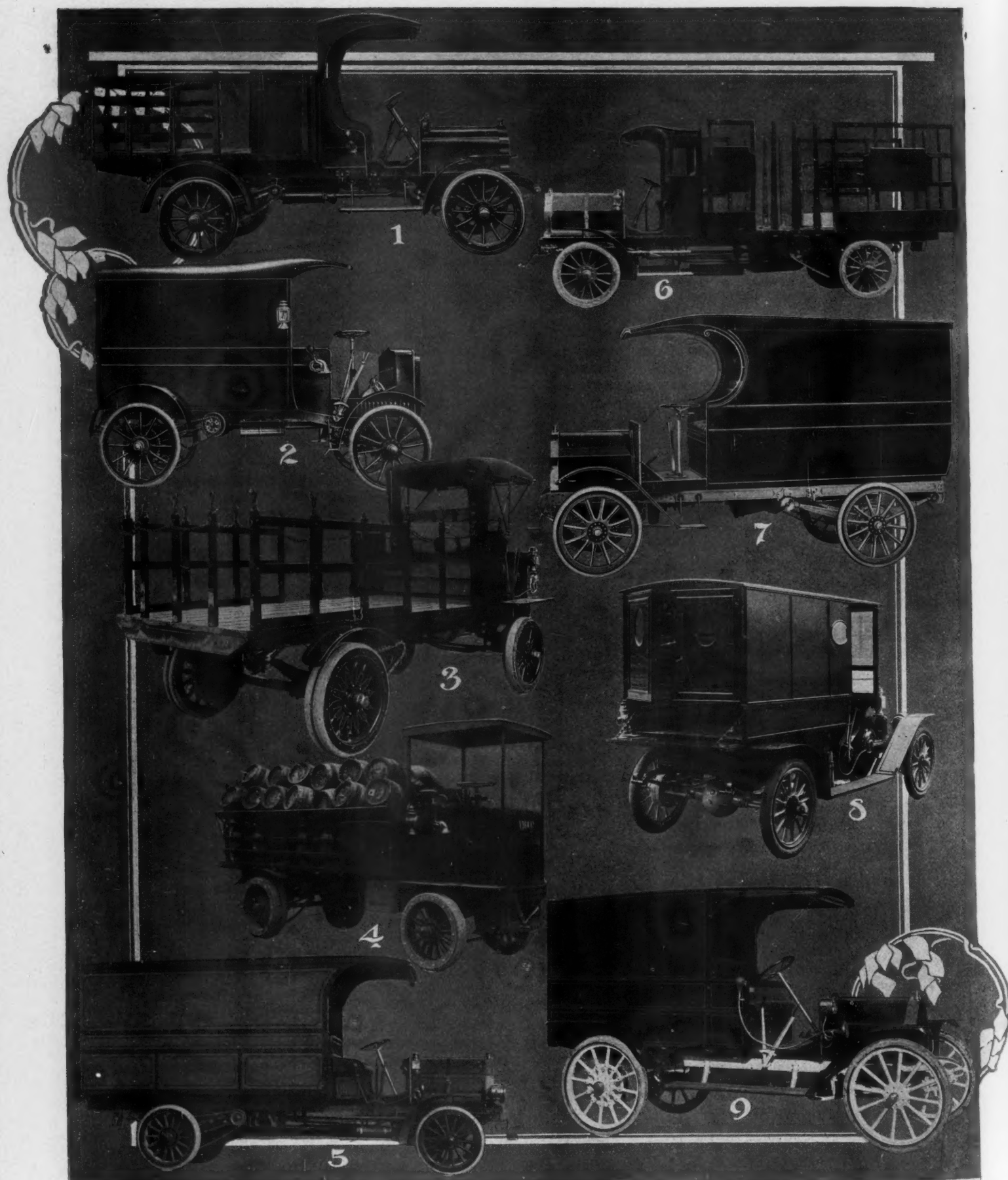
Hart-Kraft—New in the Hart-Kraft line are models C and D, the former of 3000-pound capacity and the latter of 5000-pound. Both have four-cylinder motors $4\frac{1}{4}$ by $4\frac{3}{4}$, C having 120-inch wheelbase and D 140. The Hele-Shaw clutch is used and the Evans transmission. In addition there are three chassis offerings in the two-cylinder line, designed to carry loads of from 1000 to 1500 pounds.

International Harvester—The product of the International Harvester Co. of America is a motor buggy which can be used for both business and pleasure, in that the chassis will take an express body. The engine used in the International is a



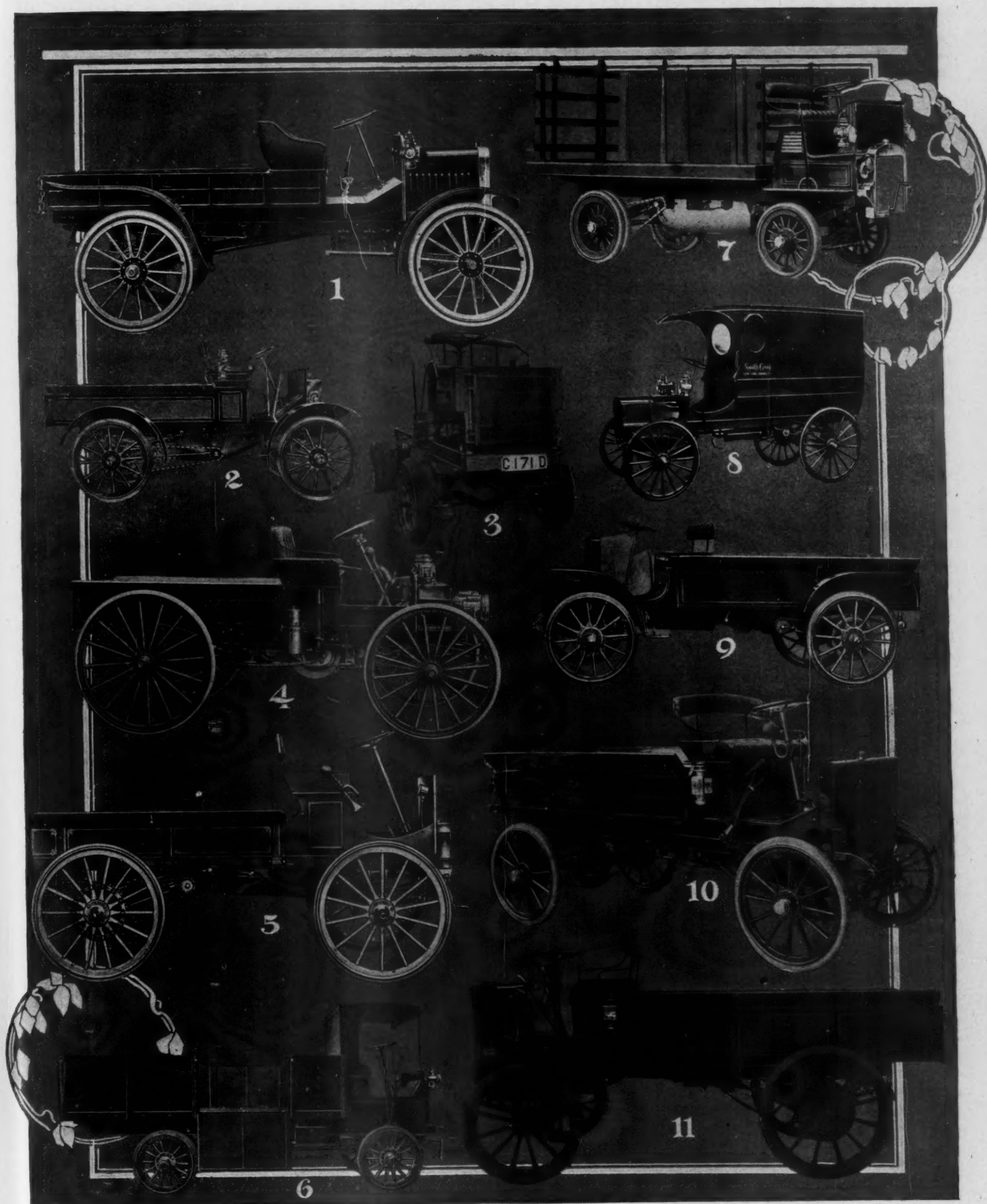
EXHIBIT OF CHICAGO PNEUMATIC TOOL CO. IN PALACE

Trucks and Light Commercial Wagons in Varied Form



1—The Big Cass Truck; 2—Babcock Light Delivery; 3—Johnson Service Co.'s 4 to 5-ton truck; 4—The American of Lockport, 5-ton truck; 5—Atterbury's panel-bodied truck; 6—The Atterbury 3-ton Truck; 7—Ewing Light Delivery; 8—Johnson Light Delivery; 9—Beyster-Detroit panel-bodied Light Delivery

Commercial Offerings at the Grand Central Palace



1—Light delivery of the Oliver; 2—The Martin for business purposes; 3—Moeller is a 5-ton truck; 4—International Harvester a High-Wheeler; 5—The Cortland Wagon; 6—One of the Grammm Trucks; 7—Seltz prominent in the show; 8—Chase's panel-body delivery car; 9—Geneva's commercial proposition; 10—Monitor Light Truck; 11—The New Penn Unit

two-cylinder opposed with a bore and stroke of 5 inches. The engine is suspended on a steel subframe under the body and an automatic oiler furnishes the lubrication. Drive is by chain to countershaft and by chain to countershaft to each rear wheel. The wheelbase is 90 inches and steering is by means of a wheel. The front wheels carry 41 by 1 $\frac{3}{4}$ -inch side wire tires and the rear 45 by 1 $\frac{3}{4}$. The engine is an air-cooler.

Johnson—The Johnson Service Co., of Milwaukee, has a second string to its bow in the way of a commercial display of wide range. There are three motors just the same as in the pleasure car line, the 30 being 4 $\frac{1}{4}$ by 4 $\frac{1}{2}$; the 40, 4 $\frac{1}{2}$ by 5 $\frac{1}{4}$; and the 50, 5 by 5 $\frac{1}{2}$. The 30 is a light delivery, the 40 a 2 to 3-ton truck, and the 50 a 4 to 5-ton truck. The power plants are the same as in the pleasure car line and shaft drive is used on the light delivery cars, while it is chain on the trucks. The body is a box and stake design, with or without tops.

Monitor—The Monitor is a 1-ton delivery wagon, which is shown by the New York agent, and the car shows several changes. The motor has been increased in power from 18 to 24 and provided with a governor set at 1,100 revolutions per minute. There is a selective type gearset instead of planetary, while the oiling system consists of a base oiler run by a gear pump, which throws a continuous stream of oil on each crankpin bearing. There is a double ignition set with a double set of plugs, while the springs are larger and the frame longer and wider.

Moeller—The New Haven Truck and Auto Co. goes in for big trucks only and has a 5-ton truck which is called the Moeller. This is its first show. The engine is a four-cylinder Rutenber with the 4 $\frac{1}{2}$ by 5-inch cylinders cast singly. Force feed lubrication is employed and there is a dual ignition system besides a multiple-disk clutch. The engine is water-cooled and the gearset selective sliding. The wheelbase on model A is 110 inches and on model B 138 inches. The tiring is 36 by 5-inch solids in front and 36 by 5 duals in the rear.

Martin—Spring suspension is one of the strong features of the product of the Martin Carriage Works, of York, Pa., its special design enabling, it is claimed, the four wheels getting the same traction despite the condition of the roads. Transverse platform springs are fitted in the rear and again in the middle of the body, being attached in the center by what might be called pivot one-point suspension. The engine is three-point suspended and big gears, all spurs, are used in the transmission. The motor is a two-cylinder horizontal opposed of 4 $\frac{1}{2}$ -inch bore and 5-inch stroke, and the drive is double chain. Thermo-syphon is used in the cooling and the oiler is force feed and gear-driven. The clutch is double disk and the frame wood and iron-armored. The wheelbase

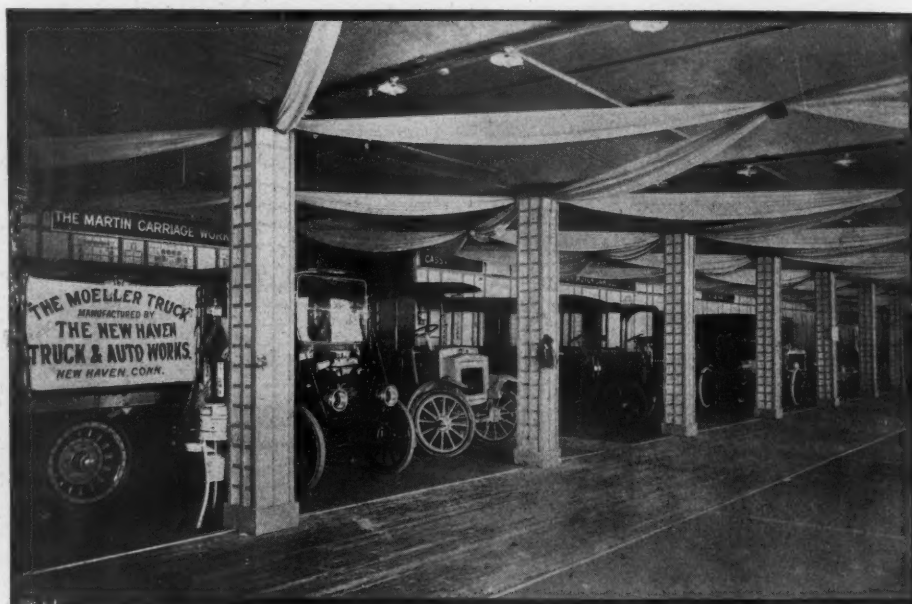
Manufacturers of Motoring Accessories

varies from 94 to 98. The Martin is designed for light commercial use and the variety of bodies caters to all businesses.

Oliver—A newcomer, the Oliver Motor Car Co., of Detroit, makes a strong feature of its removable power plant. The engine and transmission are assembled as one unit. To the front of the engine crankcase is bolted the supporting cross member, which has brackets for carrying the radiator and starting crank. The power plant may be removed by taking out a bolt at each end of the engine-supporting cross member and two nuts from the strap on the transmission case, which rests on the frame cross member, and disconnecting the gasoline pipe and foot pedals. The motor is a two-cylinder opposed, 5 inches square, which is mounted in front under the bon-

net, which are assembled on a subframe. By removing two bolts and breaking several connections the complete unit can be drawn forward until it is completely detached from the car. This power plant is mounted on the front end of the chassis under the driver's floor boards. The engine is a two-cylinder four-cycle, water-cooled and of the opposed type, with a 5-inch bore and stroke.

Seitz—Seitz trucks and delivery wagons, made by the Seitz Automobile and Transmission Co., of Detroit, comprise five different chassis in sizes of $\frac{1}{2}$, 1, 2, 3 and 5-ton, to which almost any style of body may be fitted. The feature is the Seitz double friction transmission. It is claimed that end thrust and side pressure on the friction disk has been eliminated; roller



VIEW OF TRUCK DIVISION ON THE SECOND FLOOR

net. There are thermo-syphon cooling and force-feed lubrication, while a planetary gearset is used. The wheelbase is 102 inches and the solid tires are 38 by 2 $\frac{1}{2}$ inches. There are two chassis, one of 1,200-pound capacity and the other 1 ton, and six different bodies.

Penn Unit—This is the bow of the Penn Unit, made by the Penn Unit Car Co., of Allentown, Pa., and there is a great variety of body styles designed for light delivery purposes. Among the features cited are a quick-demountable unit power plant, three-point suspension, selective sliding gearset, Hele-Shaw clutch, straight line drive, left side control, two sets of internal expanding brakes on the rear wheels, cold pressed steel frame, ball bearings throughout, large space for freight, 36-inch wheels 7, front and 40 in the rear, platform springs in front and semi-elliptic in the rear and all mechanism enclosed. The wheelbase is 90 inches, while the power unit comprises the motor, clutch, magneto, carbureter and oiling device,

bearings mounted in ball sockets making them self-aligning. The Seitz double friction transmission comprises a simple friction disk of ordinary steel about $\frac{1}{2}$ -inch thick, mounted on each end of a separate shaft, which is supported by two bearings from the main frame. The other end of the shaft is coupled through a flexible coupling direct to the engine flywheel. Two pairs of friction wheels are mounted on individual shafts from the main frame at right angles to the friction disk shaft. These wheels have paper fiber rims bolted on and the bearings for each friction wheel shaft are mounted in sliding boxes. By means of a combination of levers two opposing wheels are forced in contact with the disk at the same time at the same point, only on opposite sides of the disk, but with equal pressure. The disk shaft being flexibly connected to the engine flywheel, about $\frac{1}{4}$ -inch end play is permissible to allow the disk to adjust itself naturally between the friction wheels when pressure is applied by the lever. The

Display Many Novelties at the Show

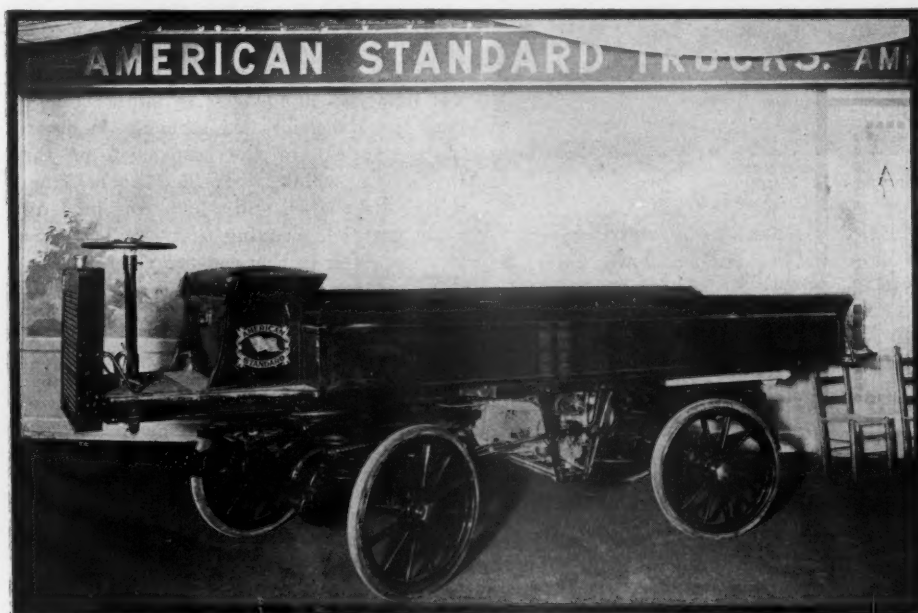
motor used is a four-cylinder water-cooled one with a 5 by 5 bore and stroke.

Saurer—The Saurer is the one foreign truck in the show. The Swiss uses a four-cylinder four-cycle water-cooled engine with the inlets and exhausts operated by camshafts placed on opposite sides of the engine, the crankshaft, fan shaft and camshafts being ball-bearinged. A high-tension magneto furnishes the ignition, while the two-nozzle carbureter is controlled by an automatic clack valve. The gearset, selective sliding, has four speeds forward, while each truck is provided with three independent brakes—a differential brake worked by a pedal, the emergency operated by a hand lever and expanding within a drum under the sprockets on the rear wheels, and the Saurer brake, which

ONE big showroom, one balcony, surrounding the main and a scattering in the departments devoted to both cars and aeroplanes, are used to display the accessory lines. While the list of accessory exhibitors is small, a number of the devices shown are interesting and useful. Among the displays are the following:

The American Pedal Co., of New York, is showing a line of pedal grips under the trade name of Apeco. The particular feature of this device is the corrugated rubber tread to prevent the foot of the operator from slipping in ordinary driving and also in emergency.

Nat Finkelstein is showing a combination tool, combining the uses of hammer, wrench, riveting mallet, tire iron and half a dozen others, called the Rex.



PRODUCT OF AMERICAN MOTOR TRUCK CO., OF DETROIT

is operated by a hand lever on the steering wheel, which shifts the exhaust camshaft and makes a two-cycle air compressor of the motor. With the clutch remaining in, braking power is attained through the driving gears. In the truck line the carrying capacity ranges from 1 to 4 tons and in omnibuses from fifteen to thirty-five persons.

Victor—The Victor, made by the Victor Motor Truck Co., of Buffalo, has a line which includes 1½, 2½, 3½ and 5-ton models, while among the body styles are sightseeing buses and even a ladder truck for fire department use. Four-cylinder motors are used throughout the line, but are of varying sizes. The 1½ takes an engine with 4¼-inch bore and 4½-inch stroke, the 2½ one of 4¾ and 5½, the 3½ a 5¼ by 6, while the 5-ton gets its power from an engine of similar size. The company pins its faith to the cone clutch, sliding selective gearset, double chain drive, magneto and battery ignition, while the wheelbase varies.

The Dixie horn, which is attached to the exhaust and is simple mechanically, and Clearview, a fluid for clearing and cleaning glass and preventing the deposit of moisture on it, are in the line handled by the Perfection Tool Accessory Co., of New York.

The Bushey Demountable Rim Co. is showing a full line of its products. The operation of this device is simple. One-quarter turn of the cam increases the circumference of the wheel and expands it against the rim so it is held very firmly in applying the rim. In removing, the process is exactly the opposite. One crank is used.

The Safety Tire Co., of New York, is showing a tire with submerged studs that is said to obviate the necessity for non-skid chains. The tread is raised and the studs, which are hollow, tubes are arranged to pick up earth or grit, to give an earth to earth contact. Wear is checked by means of the metal. The tire is guaranteed by its makers.

A curtain-fastener manufactured by the

Ross-Heaton Mfg. Co., of Emporia, Va., is one of the new things displayed at the show. The fastener is oval in form and has been tested to ten times the strain ordinarily put upon such things in actual use, according to the statements of its makers. They are said to be easily placed and it is claimed for them that they lengthen the life of the top.

The Sharp Spark Plug Co., of Wellington, Ohio, is showing a line of plugs. They are guaranteed by their makers not to carbonize or miss fire.

The New Process Vulcanizer Co., of Toledo, has a vulcanizing outfit for which it claims many excellences. The device is a compact, portable arrangement for tire repair, heated by wood alcohol. In addition the company shows a line of small tools for repair work.

The Bristol Co., of Waterbury, Conn., exhibits a line of gauges for recording pressures ranging all the way from those of running water and the tides to steam boilers and recorders for taxi-cabs.

A. H. Green & Co. show the Brandt blow torch, the La Magicienne dynamo and Salome batteries for lighting purposes. The first named is a heating apparatus using either alcohol or gasoline, the second is an electric heating and lighting system for cars and the third line is a storage battery for lighting. A number of auxiliaries are also shown.

William R. Winn displays a line of lubricating oils and greases. The Luneasy line includes cylinder oils, heavy and light greases and various affiliated substance.

A. J. Myers, showing the G & A carbureters for motor cars and aeroplanes, has an attractive booth. Sectional carbureters and complete instruments are on display showing the mechanical operation of the device in much detail.

The Standard Metal Works Co. is showing manifolds of various kinds suitable for gas engines. The feature of the exhibit is the Div-Plug, a patented cylinder connection.

The John W. Rapp Co. exhibits its line of metal bodies. These are light and cover the field pretty thoroughly. Fabrikoid, a cloth used in top making, is shown in one end of the accessory hall. This fabric is of mohair on a rubber base.

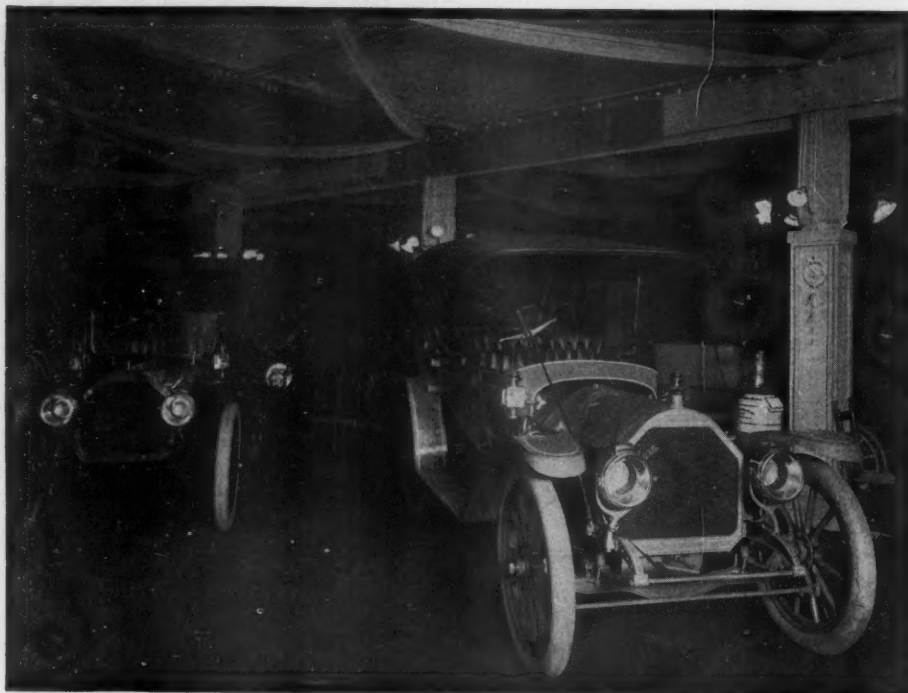
Duntley electric portable tools are shown by the Chicago Pneumatic Tool Co. These include several types of drills, blowers, etc.

The vertical dividable windshield is shown in the balcony by the Auto Necessities Co., of New York. The shield is made of two sections of glass so arranged that they may be used singly or folded down alongside the hood of the car.

The Economy Tread Co. exhibits its tread and tire protector. The tread is made of chrome tire leather, studded with flat-top rivets of steel. It is adjusted by clamp to the clincher.

The Behringer radiator, built in light sections that are removable with ease, is a feature of the main accessory hall exhibit. The

Chicago Court Holds Weed Tire Chain Patent Invalid



WHERE THE DISPLAY OF AUBURNS IS MADE

sections are composed of strips as long as the radiator, held in place by joints at the top. The makers say that it is easy cleaned.

The Ideal wind-deflector, a non-glass shield, the Gregory spark metal gas igniter to obviate the use of matches, the Buffington folding metal chairs and stools, for extra seats in cars, the Ball multi-spark plug made in Minneapolis, the B & E line of specialties, including a demountable rim, covers, non-skid sectional devices, dome-lights, wind-shields and lamp covers, occupy spaces.

A. H. Kasner, exhibiting the Anchor tires in much detail, has a busy stand. In addition to the regular line, patches of various kinds are shown.

CHICAGO, Jan. 3—A most important decision was handed down today in the United States circuit court of appeals for the seventh circuit by Judges Grosscup, Baker and Seaman. The decision grants the appeal of the Excelsior Supply Co., and the Motor Appliance Co. against the interlocutory decree which was granted the Weed Chain Tire Grip Co. restraining the Excelsior Supply Co. and the Motor Appliance Co. from manufacturing and selling Zig-Zag tire chains. By Judge Grosscup's decision the original decision in favor of Weed is reversed, the case is remanded with instructions to enter a decree dismissing the bill for want of equity.

The case in question arises from the legal controversy between the Weed Chain Tire Grip Co. and the Excelsior Supply Co., the Weed company claiming the Excelsior concern infringed letter patent No. 723,299, issued March 24, 1903, to Harry Parsons. This patent relates to anti-slipping devices for motor tires, the leading feature of which patent being that the anti-skid or chain was not rigidly connected to the tire. Some months ago a decision was handed down sustaining the Weed patent, but today's decision sets the patent aside entirely, the decision being in favor of the Excelsior Company and fully protecting this company in the sale and manufacture of its Zigzag tire chains. The decision is effective throughout the entire country. The decision protects the Motor Appliance Co. in the manufacture of Zig-Zag chains, also the Excelsior Supply Co. in the sale of same, and also all users in the use of these chains. Immediately the decision was announced by Judge Grosscup, the Excelsior Co., through its attorneys, applied for the suspension of the injunction which restrained them from selling its chains, and which was immediately granted, meaning that privilege was at once given to this concern to engage in this business.

Judge Grosscup and his fellow judges in their opinion cite that the reason for reversing the original decision was that the Parsons' patent was antedated by a patent granted Maxim & Bardwell, August 20, 1901. This patent referred to a detachable traction strap made of leather which was free to creep circumferentially on the tire. The circumferential creep is the vital point of the Parsons' patent, and the court held that although the Maxim & Bardwell patent stipulated leather, whereas the Parsons' patent stipulated metal, this difference in material did not constitute sufficient ground to sustain the validity of the Parsons' patent. In the closing paragraph of its decision the court says:

"The argument is made, however, that the Maxim & Bardwell device was not commercially operative. Mechanically, of course, it was operative, the circumferential creeping being perhaps less rapid than where metal was used. True, a substitution of one material for another in a device mechanically operative, but commercially worthless may be the invention. But it is not necessarily so; and, for the reason already stated, it is not in this instance, in our judgment, invention. To the extent that this argument is used to show that, within the meaning of patent law, it cannot be an anticipation because it is not inoperative, it fails; for, mechanically, it is operative. To the extent that it is used to maintain the patentability of a chain, it fails for the reason named."



McFARLAN SIX MAKES ITS BOW AT THE PALACE

Chicago Truck Representatives Organize to Boom Show

CHICAGO, Jan. 4—Temporary organization for united action in connection with the coming commercial motor vehicle show was effected at a called meeting of Chicago representatives of leading motor truck and delivery wagon manufacturers held this noon at the New Southern hotel. Henry Paulman was elected chairman of the meeting and L. C. Long, temporary secretary.

After a discussion of ways and means for arousing widespread public interest in the commercial car display, the following chairmen of committees were appointed: Henry Paulman, organization; L. C. Long, membership; Edward W. Curtis, Jr., publicity; A. P. Lee, attendance; James E. Plew, finance.

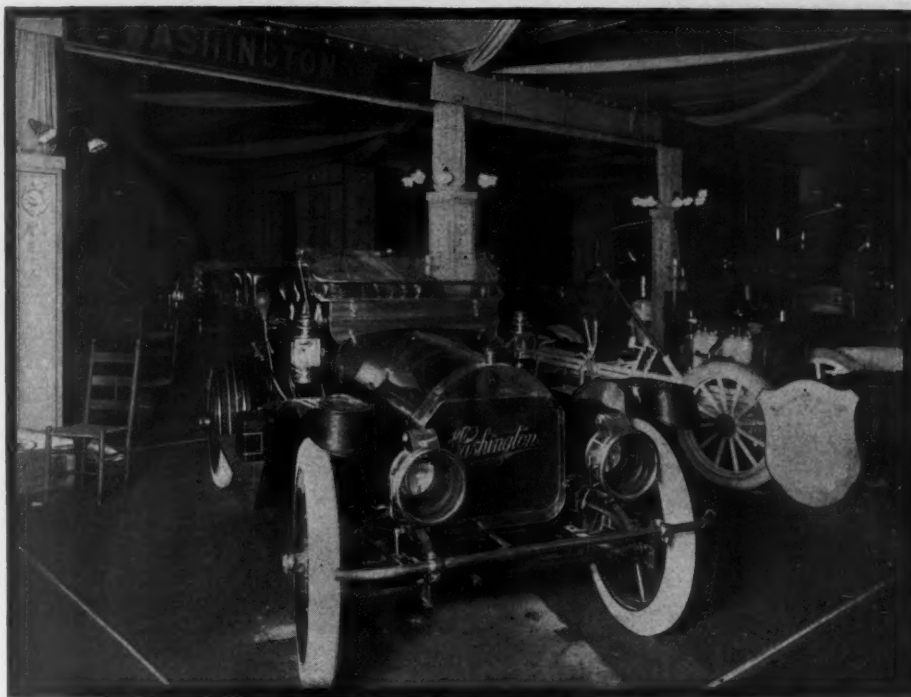
Each chairman is to appoint other members to act with him on his own committee. All Chicago representatives of manufacturers who will have exhibits of complete vehicles during the second week of the show, from February 6 to 11, and all exhibitors who have no local representatives will be invited to become members of the organization and to attend the next meeting, which will be held next Tuesday. Subsequent meetings are to be held the following Friday and each Tuesday and Friday thereafter until the end of the show.

This is an open organization for the purpose of furthering the interests of the motor truck industry as a whole, and manufacturers and representatives are invited to attend the meetings and take an active part in the work, whether or not their own vehicles are to be exhibited at the Coliseum.

Those present at the meeting Wednesday noon were: Henry Paulman, Pierce-Arrow; L. C. Long and Ralph Penn, Packard; J. A. Bell and James E. Plew, White; Edward W. Curtis, Jr., Studebaker; P. C. Chrysler and S. H. Peterson, General Vehicle Co.; A. P. Lee, Peerless; John R. Bensley, Kelley; W. A. Zimmerman, Mercury; C. A. Coey, Mais, and M. C. Hogard, Metzger.

BULL DOG IN NEW YORK

New York, Jan. 2—Covered with the combined mud of thirty-five states in which it has traveled, and with a total mileage of 21,078 miles to its credit, the 100,000 mile Abbott-Detroit Bull Dog arrived in New York city late last night. The car has been out since July 10. On Thanksgiving Day the Abbott drivers were in Portland, Me., their furthest eastern and northern point, and on Christmas Day they were in Jacksonville, Fla., their furthest southern point. The car, which is a 1910 Abbott, has been running continuously every day since it left Kansas City, and bears upon its tonneau the signatures of hundreds of autographs which have been painted, carved and written upon it



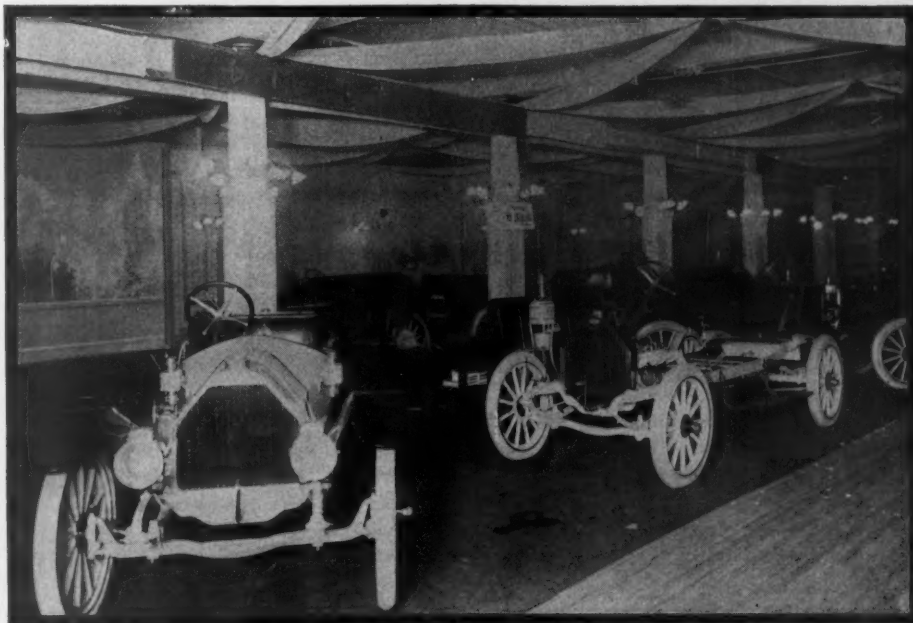
WASHINGTON CAR EXHIBIT IN GRAND CENTRAL PALACE

in the cities visited. After the Grand Central palace show, the Bull Dog will go back to Detroit by way of Hornell, Elmira and Binghamton, and from Detroit will attend the Chicago show after which the carnival at New Orleans during Mardi Gras week will be attended.

PARRY PLANT WILL BE SOLD

Indianapolis, Ind., Jan. 2—The Union Trust Co., receiver for the Parry Automobile Co., has been instructed by Judge Vinson Carter, of the Marion superior court, to sell the motor car company's property on January 10. It is known there will be at least two bidders, and it is quite likely

there will be more. Recently the trust company was given authority to operate the plant and to issue \$25,000 in receivers' certificates for the purpose. Operation was attempted, but a number of orders were canceled because prospective purchasers feared they could not obtain duplicate parts. The receiver then asked authority to sell the plant, which was granted. The property has been appraised at \$139,000 as an active, operating concern, but as an inactive company this appraisal probably would be much lower. The court has fixed \$50,000 as the minimum bid to be considered. Creditors of the company will submit a bid.



DETAMBLE LINE IN GRAND CENTRAL PALACE SHOW

Latest Ideas for 1911 in Foreign Motor Car Construction



GENERAL VIEW OF THE HOTEL ASTOR'S BALL ROOM IN WHICH IMPORTERS' SHOW IS BEING HELD

NEW YORK, Jan. 2.—The banquetting hall of the Hotel Astor is the venue chosen this year for the importers' salon. The space is somewhat limited, but as there are only fifteen different makes of cars shown, the hall with its two wings do not seem to be overcrowded. The limousine seems the standard of body design in one form or another. Where a touring car is shown it is usual of the torpedo type. On entering the hotel by the main Broadway entrance, one meets two polished chassis, one a de Dion four-cylinder on the left, specially designed for American roads, and a 25-35-horsepower Renault chassis on the right.

The de Dion-Bouton chassis has one or two departures from the usual de Dion practice, such as an air-cooled foot brake and self-supporting rear axles instead of the subaxle type. The center of gravity is high and the rear springs, which are of the three-quarter elliptic type, are very long.

Passing into the side wing of the main hall, one meets the Metallurgique exhibit, consisting of a special limousine chassis and body manufactured in Belgium. A feature of this car is the inside fittings, which are all made from selected woods, with the exception of the seats, which are upholstered

and trimmed with lace cushions. A dome is fitted in the roof as well as two extra armchair seats in Louis XIV style. The chassis is fitted with a 40-horsepower motor of the L type, Bosch high-tension magneto and Zenith carbureter. The wheelbase is 144 inches and there are twin tires on the rear wheels fitted to Vinet rims. This car is new to America and Warwick Wright, the managing director of the English agency which takes the entire production from the Belgium works, has come over to introduce the car. A characteristic feature of all Metallurgique cars is a V-nosed radiator sometimes seen on racing cars.

Next to the foregoing is the S. P. A., also a newcomer. The chassis is made in Turin, Italy, and is on the lines of other Italian cars. It was designed by M. Ceirano, who for several years was the designer of the Italian cars. Two cars are shown, a two-seated raceabout with large gasoline tank and holder for four tires on the rear, and a 20-horsepower landaulet.

Two other chassis were expected, but will not be on exhibition till Wednesday. The motor of the 15-20-horsepower is of the monobloc type with the valves on one side, high-tension magneto ignition, and forced feed lubrication. The clutch is of the multiple-disk type and the transmission is selective with four speeds and reverse. The final drive is by live axle. The agents for New England for these motor cars are A. C.

Morse & Co., Park square, Boston, Mass.

The Darracq exhibit consists of a six-cylinder touring car fitted for seven passengers and a 24-horsepower landaulet painted green and upholstered in French cord.

The Peugeot exhibit was not staged at the time of writing. This car is manufactured in France and was one of the pioneers of the early nineties.

On entering the banquetting hall proper on the left is the C. G. V. and Zedel exhibit, consisting of a limousine by Kellner of Paris on a six-cylinder chassis and a low-built close-coupled touring car tastefully painted in gray and red lines. There are also a town landaulet with body work by Demarest and a four-cylinder 16-20-horsepower coupe to accommodate three passengers inside. All the C. G. V. cars have left-hand steering with central control for the gear and brake levers. The radiator is placed behind the motor, forming the dash and the piping of the thermo-syphon cooling is on the left side. The Zedel is a French car also, being made in the south of France. Although not already on exhibition, the car to be shown is an inside-drive landaulet fitted to a 12-horsepower chassis. The motor has a bore of 72 millimeter and a stroke of 120 millimeter and, unlike most cars of this power,



Shown in Importers' Salon Held in Hotel Astor in New York



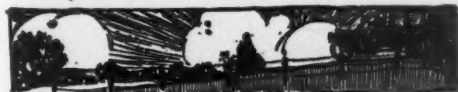
LOOKING DOWN UPON THE IMPORTERS' SHOW IN HOTEL ASTOR'S BALL ROOM

is fitted with four speeds. The motor is of the bloc type.

The Panhard & Levasser agency is showing one of the Panhard Knight engines of 30-horsepower fitted to a standard Panhard chassis, as well as a special limousine by M. Labourdette of Paris. It is built to carry seven passengers, upholstered in drab cord cloth, and has two reversible seats that can be made to face forward or vis-a-vis. Besides this, there are a six-cylinder, 35-horsepower chassis fitted with a limousine-body town landaulet on a Knight Panhard chassis, and a 14-horsepower town landaulet with bodywork by Holbrook.

The de Dion exhibit is the last on the left-hand side and is comprised of five models. A polished chassis is shown similar to the one at the entrance, only of a lower power. An eight-cylinder torpedo of clean-cut design, painted light fawn, has the gasoline tank situated under the cowl of the sloping dash. A neat town landaulet by Burr & Co. and a limousine also are shown.

The S. P. O. Automobile Co. exhibits a two-seated S. P. O. car of the raceabout type and a Vinot-Degugnaud. Both of these cars are manufactured in France. The miniature limousine fitted to the Vinot is after the style of an old-time coach.



Quimby & Co., of Newark, N. J., have three models of the Italian Isotta cars fitted with their body work, a toy tonneau, a limousine and a five-passenger touring limousine. Besides these there is a fore-door type of limousine without chassis, with the bare aluminum panels, a Quimby specialty.

The Napier exhibit consists of a six-cylinder chassis fitted with detachable wire wheels and an example of English body work by Milliner, of London, being a light green landaulet with uncommon lines.

The Benz exhibit is large and the center of attraction on it is the No. 15 Benz in which Bruce H. Brown won the grand prize recently at Savannah. A neat 30-horsepower sport wagon and a roomy 50-horsepower torpedo, painted white and upholstered in light pigskin, comprise the open cars, besides which are several limousines and landaulets ranging from 18 to 50 horsepower.

A. T. Demarest & Co are showing the Itala, Renault and English Daimler cars. The last named, however, had not arrived. The Itala exhibit consists of a 16-20-horsepower chassis, a town landaulet painted dark blue with white lines on a 16-horsepower chassis and a 20-30-horsepower limousine. There also are three Renault chassis with Demarest bodywork. At the end of the right aisle is the Renault exhibit,

in which there are two novelties in body design. A 25-35-horsepower chassis is fitted with a berline body. It is a large fore-door limousine to accommodate six passengers inside and was built by Moore & Mongoer. There is an ice box for provisions, a wash basin, writing cabinet, extra sliding wood shields to take the place of the ordinary glass windows. The front windows can be lowered and mosquito netting covered frames can be drawn up instead, giving plenty of air, but excluding flies and dust. The top is raised into a dome, with side lights. The front compartment is entirely enclosed with a small leather hood over the top of the windshield and although the car is very large it has a good appearance. The 50-60-horsepower cabriolet is a distinctive creation and has the advantage of being turned from an entirely closed car to an open car in a few minutes. It is painted French gray and trimmed in light pigskin. The balance of the exhibit consists of three 25-35 horsepower American special chassis fitted with limousine and landaulet bodies and a 10-12-horsepower 1911 chassis with underslung rear springs, this being a departure from the usual Renault practice of the past years.



French Scenes for Chicago Show

CHICAGO, Jan. 2.—The last detail of the scheme of decoration and equipment of the Chicago show has just been completed and an authentic announcement of its character is, for the first time, available. Actual work on some of the material commenced 3 months ago and a great part of it is practically complete. No fewer than six decorating concerns are at work, the workmen including scenic artists, sculptors, staff makers, carpenters, sign makers, workers in papier mache, artificial flowers and art glass, plumbers, electricians, carpet makers and foresters.

So much favorable comment resulted from last year's garden scene, with its giant trees, bronze railings and gates, brick walls and blue sky, that the management was loath to depart from it, but finally decided to stick to its time-honored custom of a complete change in the main building. And so the English garden has given away to a French scene typical of the times of Louis XV.

Perhaps the most striking features of the Coliseum display will be the ceiling and four gigantic fountains. The entire roof of the building, 300 by 175 feet, will represent stained glass supported on massive scrolls of bronze.

It was claimed, and the claim has not been disputed, that last year's ceiling conception—a blue sky, into which stretched the branches of the trees on the main floor—was absolutely original. It is now believed that the same is true of the ceiling now in course of preparation. It is a gigantic undertaking, requiring the work of several men for about 3 months. It is in effect a painting covering 52,000 square feet of canvas and other material.

The main floor of the Coliseum is divided into four sections, each 113 by 47 feet. In the center of each section a fountain will be erected, 30 feet wide at the base and 38 feet high. The central column will be illuminated, as will also a huge lantern at the top. Water will fall in a 4-foot column from a height of 28 feet. Stretching away to right and left will be illuminated shell-shaped vases, mounted 10 feet in the air on ornamental bases, each vase being about 6 feet high by 5 feet wide. Between them will be lampposts bearing clusters of 12-inch and 16-inch lighted globes. The beauty of all these features will be enhanced by floral decoration.

At the aisle fronts of the central spaces lampposts bearing 12-inch globes and vases and real flowers will mark the entrance to the spaces. On the opposite side of the aisle, entirely covering the iron girders which support the building, massive pillars will extend from the floor to the gallery, each pillar about 18 feet high, of design to correspond with the fountains and other central features. These will support the ceiling, also of ornate construc-

tion, through which at intervals of 11 feet will protrude 500-watt tungsten burners, this being the first demonstration on a large scale of this new light in Chicago. The illumination of the building as a whole will be more elaborate and more brilliant than heretofore.

The gallery will be similarly treated. The present seating will be covered by a temporary platform to accommodate exhibits of accessories. The scene along the front will correspond with the ceiling and at each truss, 24 feet apart, there will be an ornamental column with an illuminated cap. Running back from these columns will be ornamental panels which will enclose the iron girders. Similar effects will be produced on the three floors of the annex.

But the splendid effects of last year have not been entirely discarded. Some of the exhibitors in the First Regiment armory expressed a desire that the trees, gates, walls, railings and shrubs which made up the English garden be transferred to their department of the show. With necessary modifications this will be done. Giant trees will be a feature of the central spaces—somewhat smaller than the 65-foot specimens used in the Coliseum last year, but fully as large as the building can accommodate. Trees will line the gallery also. The general effect will be like that of the main building during the record-breaking show of 1910.

SCHEBLER PRIZES AWARDED

Indianapolis, Ind., Dec. 31.—Wheeler & Schebler have awarded the prizes in their drivers' contest, which lasted from July 1, 1909, to June 30, 1910. There were five prizes, \$1,000 going to Ray Harroun, who won thirty-five races; Bob Burman got \$500 for thirty-three firsts; Barney Oldfield, \$300 for nineteen firsts; Johnny Aitken, \$200 for fourteen firsts; and Louis Chevrolet, \$100 for eleven firsts. These prizes were awarded to the drivers winning the most firsts at race meets sanctioned by the A. A. A., the only stipulation being that the cars must be equipped with Schebler carbureters. The checks were placed in the hands of the winners just before Christmas.

WOULD CHANGE NEBRASKA LAW

Lincoln, Neb., Dec. 31.—Addison Wait, the new secretary of the state of Nebraska, has drawn up a number of important amendments to the present motor law of this state. He will have this introduced into the legislature, which meets in January. His proposed law will change the annual license fee of \$1 to one of \$5 for motor cars and \$2 for motor cycles, but these fees are to be in lieu of all other state taxes as levied by the state board of equalization and assessment. One-half of these fees is to be paid by the secretary of state to the state treasurer for

the benefit of the state general fund, and the other half to be distributed on the first of each year to each and every county in the state on an equal per capita basis, according to the national census for the year 1910, the latter fund to be used for the improvement of the public highways in said counties under and by the supervision of the authorities provided by statute.

The proposed law gives dealers a chance to obtain three duplicate numbers to be used on cars while demonstrating, the fee for each dealer's permit to be \$10 a year. The word dealer will appear below the number, and such numbers will only be used on demonstrating machines. Dealers' permits do not exempt the owner from state taxes. Those having paid license fees in other states are exempt.

Persons under 16 are prohibited from operating a motor vehicle, and any person in an intoxicated condition who shall operate one shall be deemed guilty of a misdemeanor. If a motor vehicle has injured anyone, persons are required to give their names or be deemed guilty of a felony.

CADILLAC BREAKS ROAD RECORD

San Francisco, Cal., Dec. 24.—After standing unbroken for nearly 3 years, the much coveted round trip record between San Francisco and Los Angeles was smashed last week by a Cadillac 30 touring car, which made the 1,000-mile run in 32 hours 35 minutes. The best previous record was made early in 1908 by Fernando Nelson in a White steam car in 36 hours 58 minutes. Many attempts were made to wrest the laurels from the White company, but every well intended effort proved unsuccessful until the Cadillac, practically unannounced, pulled into the checking station at Market and Guerrero streets in this city 14 hours 49 minutes and 39 seconds after leaving the Times ruins in Los Angeles, and after a delay of 30 minutes in securing a fresh supply of fuel and making one or two minor adjustments started back on its return trip, checking in again at the starting point 32 hours 35 minutes after starting on its flight against time.

Several drivers were used in making the run, but the car held up well under the strain of some none too good mountain roads, and on reaching Los Angeles started on a 7-days' non-stop run to demonstrate the stamina of its motor. Aside from winning the round trip record, the Cadillac also created a new record for the up trip run, setting this record at 14:49:30, or 1 hour, 55 minutes and 30 seconds faster than the previous one-way record held by the Thomas Flyer and made last year.

The Fernando Nelson trophy is valued at \$800 and was offered by Nelson in 1904, and was first won by W. R. Densmore, who covered the one-way route in a Packard in 53 hours. In the same year Fred Jacobs piloted his Rambler over the route in 31 hours 35 minutes. Next came N. H. Nares in a Pope-Toledo, who ne-

gotiated the distance in 24 hours 53 minutes, and then George Hensley made the down trip in 21 hours in a White. In 1906 J. A. Lansberger lowered the record to 21 hours 5 minutes, but was disqualified because he only carried three passengers, while the trophy rules required four-passengers.

Fernando Nelson, the donor of the trophy, was the next to try to cut the record. In a Columbia car he made the one-way run in 18 hours 13 minutes. In 1908 he again tried to lower his own record in a White steamer and made the run down in 17 hours 17 minutes, and the round trip in 36 hours 58 minutes. Last year Brasse in a Thomas made the down trip in 16 hours 45 minutes. These latter records were standing when the Cadillac shot them to pieces.

UTAH FOR GOOD ROADS

Salt Lake City, Utah, Dec. 29—Good roads in Utah are merely a matter of time and the culmination of effort. This was prophesied in no uncertain terms by the sentiment that prevailed at the banquet of the Automobile Club of Utah on Wednesday evening in the banquet room of the new Commercial Club in Salt Lake City. Fully 200 members and invited guests were at the table, and in the midst of the banquet Governor Spry, of Utah, was ushered in at an auspicious moment. Governor Spry's address was full of gratifying surprises. Among other things he assured the membership that if he may have his way at the next session of the legislature, which convenes next month, he will have the appropriation for the improvement of roads doubled. He deplored the sums of money spent in an unsystematic manner before the recent laws regarding road construction were enacted. He feels that the progress has been gratifying under the new regime. The members suddenly sat up and took notice of things when Governor Spry intimated that he thought motor cars in Utah should be taxed according to their horsepower. Mayor Glasman, of Ogden, was the next speaker, and said it was time to stop talking roads costing \$5,000 a mile and take up the building of roads at \$500 a mile, which, he said, the county commissioners of Weber county have demonstrated by having already built 7 miles of fine road from Ogden toward Salt Lake, employing the sprinkling system. He also voiced the resolution of the last good roads convention held here advocating the taxation of motor cars by horsepower and having the state appropriate dollar for dollar for such taxation. Mayor Bransford, of Salt Lake City, spoke not only from the standpoint of the value of good roads to both municipality and county, but voiced his sentiments as a motor enthusiast as well. He called attention to the giant strides that have been made in the paving of Salt Lake City, and said that \$700,000 has been spent in street improvements in the last year.

Paris Salon Next Winter Doubtful

PARIS, Dec. 21.—The motor show, which has just closed in the Grand Palais, admittedly was the most successful Paris has ever known. The number of visitors alone is proof of this, the figures being 570,335 paid entries for the 15 days, or 44,000 more than for the last show. The question now is, "Will a salon be held in 1911?" Officially nothing is known. So far as can be gathered from conversation with the leading exhibitors, however, there is a strong feeling against an annual show. It is admitted that good business has been done, and that with the sharing of the profits the show will be cheaper than any previous one, but there is a strong feeling that new models should not be produced annually.

It is declared that the industry has settled down to such fixed lines that it is impossible to thoroughly try out new ideas within an interval of 12 months. Thus an annual show tends towards an annual model and changes merely for the sake of change, without considering whether they are of real value or not. Some of the leading factories, too, are doing their best to get away from annual models, and in the past 2 years have adopted improvements as soon as they were convinced of their value without waiting for them to be offered at the show season. Those in favor of an annual show comprise the smaller manufacturers and agents and dealers, who hold to the belief that a public exhibition tends to give a fillip to trade. It almost is certain, however, that the more powerful manufacturers will carry the day, and that under their influence the Grand Palais will stand empty in 1911, only to be opened again in 1912.

Arrangements for alternating shows in London and Paris are not likely to meet with much favor in France. To do this would merely be to continue the present system in a milder form. Although the French factories would not have to undertake the direct responsibility of exhibiting at London, they would be almost obliged, after agreeing to alternate shows, to produce new models every year. The Frenchmen would prefer to allow England to continue its annual show at Olympia, while they only occupied the Grand Palais every 2 years. The Englishmen, although willing to make economies, as is evidenced by their proposal for alternate shows, are too anxious to move the European market from Paris to London to lightly give any advantage to their French rivals. The Frenchmen, knowing that they have practically all the European export trade, are too much inclined to belittle the English manufacturers.

Acknowledgment has had to be made that the long-stroke motor—a motor with a stroke more than twice the bore—is a standard and not a racing product. The acknowledgment has come by the admittance of this type of motor into the

French light-car race to be run at Boulogne next June. With a view to getting together practically stock cars with a four-cylinder motor of not more than 90 millimeters bore, the regulations fixed on a cylinder area of 3 liters, with a piston stroke not greater than twice the bore and not less than the bore. It was believed that although the motors were classed under cylinder area, long strokes would prevail. But immediately the rules were out it became evident that some stock cars would be eliminated owing to the regulation making it impossible to have a stroke more than twice the bore. Sizaire-Naudin, for instance, wished to put in a set of cars with 70 to 170 millimeters (2.7 by 6.69 inches). This gives a cylinder area of only 2 liters 617, while the maximum is 3. It was impossible to declare that these were not standard dimensions, seeing that they will comprise nine-tenths of the firm's output for 1911, as has been proven by the company.

To get out of the difficulty the committee has decided that the ratio of stroke to bore can be higher than 2 to 1 on condition that these dimensions figure on the 1911 catalog, but in no case can the ratio be higher than the catalog. Thus the Sizaire-Naudin people can come in with their 70 by 170, and also can, if desired, increase the bore to 74.9 millimeters, with a stroke of 170 millimeters, in order to have the maximum of 3 liters. In protesting against the old rule the long-stroke advocates claimed that the ratio of 2 to 1 was not necessarily the limit for standard touring cars, and the Sizaire-Naudin people in particular declared that they preferred 74 by 170 to 90 by 117, both of which give a cylinder area of 3 liters for such a competition.

The light-car race will be of more than ordinary interest, because it will bring together cars having the same cylinder volume but varying in ratio from 1.2 to 1 to as high as 2.3 to 1. In addition to the Sizaire-Naudin company, the Spanish firm of Hispano-Suiza will take advantage of the change in rule allowing it to have a higher ratio than 2 to 1. It has a standard model with bore and stroke of 80 by 180, and although this is too big for the race, it will prefer to cut down the bore more than the stroke so as to retain its ratio of 2.25 to 1.

Prospects for this race are rosy. Delage, a light-car specialist, has already entered four cars. Others having promised to come in are Sizaire-Naudin, Lion-Peugeot, Motobloc, La Buire, Cottin-Desgouttes, Rolland-Pilain, Gregoire, Benz, Opel, Fiat, Hispano-Suiza, Vauxhall, and Argyll. Cars taking part in the race must weigh complete not less than 1,763 pounds, without tools, oil, gasoline or spares, carry two seats, running boards and mudguards not less than 8 inches in width. A big entry list is anticipated.



The 'Readers' Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

DENVER, Colo.—Editor Motor Age—I am a constant reader of Motor Age and would thank Motor Age to answer the following questions through the Readers' Clearing House:

1—We have a 1909 18-horsepower Franklin, model G. Do the small holes in each cylinder, used for priming purposes cause the motor to skip? Are they not a disadvantage, and can one make a Franklin run on slow speed without missing?

2—Is the timing correct when the explosion takes place when the piston is descending from the top of the combustion chamber about $\frac{1}{8}$ inch on its way downward?

3—When the motor is laboring hard going up grade, why is it that on advancing the throttle the gear slips from high speed to intermediate? Does this do any harm?

4—Is the material any better on the Franklin motors than any other motor on account of the high degree of heat, which I am told is 355 degrees?

5—Please explain the difference between the sliding and the selective type of gearset; also explain the difference between high and low-tension magnetos.

6—How many miles per hour do I have to go before my motor develops 18 horsepower?—Marvin C.

1—No. The small holes to which you refer do not cause the motor to miss fire. They are not disadvantageous, it is claimed, and do not prevent the motor from slowing down. If you are having trouble of this sort, it is probable that the valves need grinding or there is a slight leak in the auxiliary exhaust valve or around the ports of one or more of the auxiliary exhaust pipe connections. A poor carburetor adjustment might also be the cause of your trouble. With all cylinder and inlet pipe and valve connections air-tight, and the carburetor properly adjusted, Franklin motors can be slowed down very nicely without misfiring.

2—The contact points on the magneto should begin to separate when the dead-center point on the flywheel is in a posi-

Sliding and Selective Gearsets

tion 3 to $3\frac{1}{2}$ inches before center on the motor. This would cause ignition of the charges in the cylinders before the pistons had passed over center and started to descend on the explosion stroke; but, as the combustion of the mixture is not instantaneous, the piston is in reality on its downward power stroke when the combustion is most complete and its power of expansion develops. Whether or not the explosion takes place at more or less than $\frac{1}{8}$ inch of the piston's down stroke depends upon the speed of the motor. At higher speeds the spark occurs earlier and at slow speeds later. This is because at higher speeds more current is generated by the magneto and it travels faster through the ignition appliances.

3—The slipping from high into the intermediate speed is due to failure of the dog on the shifting lever to grip the quadrant securely. This might be due to excessive wear of the dog. It is hardly due to wear of the notch in the quadrant, as it is case hardened. Damage to the gears of the

5—A selective gearset is one in which a change from one speed to any other may be made without having to pass through an intermediate speed. With a selective gearset a driver may shift from the first or low speed gears into third without having to slide the second speed gears in and out of mesh first; or he may change from second to reverse without having to pass through first, etc. There is no comparative difference between a sliding gear and selective type of gearset. Most gearsets are of the selective sliding-gear type, the selective feature pertaining to the facilities of changing from one speed combination to another without having to first pass through another intermediate combination; and the sliding-gear feature indicating that the gears are arranged to slide into and out of mesh with each other to bring about the different speed combinations. In Figs. 1 and 2 two types of sliding gearsets are illustrated, a selective and a progressive; and a study of positions of the various gears in the different speed combinations will readily reveal the difference between a selective and progressive gearset, and at the same time show that both are of the sliding-gear design.

The difference between a high and a low-tension magneto is that a high-tension magneto is a complete apparatus from which a high-tension current can be obtained; whilst a low-tension magneto is a machine from which, without the aid of a separate auxiliary coil, only a low-tension current can be gotten. Both high and low-tension magnetos are commonly employed in jump-spark ignition systems which require a high-tension current, and where a low-tension magneto is employed an auxiliary induction coil is used in connection therewith, generally located on the dashboard of the car. The features of two prominent types of magnetos, a high and a low-tension type, were shown in detail in the October 27 issue of Motor Age on pages 18 and 19, with wiring connections showing the relations between the various parts and means wherein the difference between the two systems is indicated.

6—Your car, if a touring type with a gear ratio of $4\frac{1}{4}$ to 1, and 32-inch wheels, should begin to develop 18 horsepower at a speed of 25 miles per hour on the direct drive.

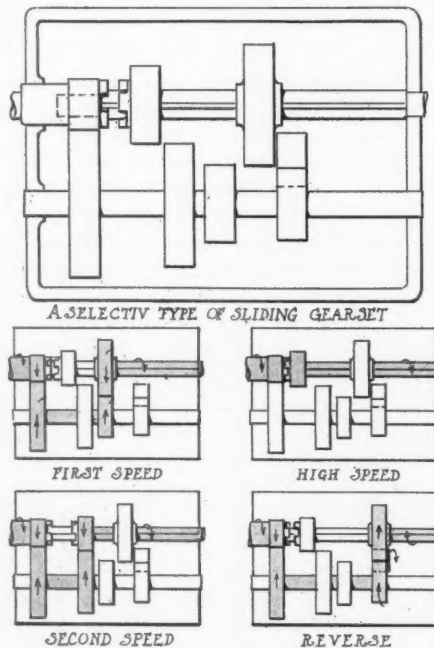


FIG. 1—SPEED CHANGES OF SELECTIVE GEARSET

intermediate speed is quite liable to occur if this trouble is neglected, and should a corner of a tooth be knocked off and become lodged between other teeth serious damage might result.

4—The design and construction are slightly different; and the materials in some parts may be adapted to withstand a higher heat than those employed in a water-cooled motor, but they are not necessarily of a better grade.



Motoring Questions Answered



Stroke Factor in Horsepower Rating

Milton, N. D.—Editor Motor Age—Will Motor Age through the Readers' Clearing House answer the following questions:

1—Has Motor Age heard of any person graduating from the Empire Auto Institute, and is it a reliable school?

2—Will Motor Age kindly give me a formula for figuring the horsepower of motors which takes the stroke into consideration.

3—Does Motor Age favor the long stroke and offset crankshaft?

4—Does a valve-in-the-head motor give more power than the L or T-type?—Reader.

1—Motor Age never has heard of the Empire Auto Institute.

2—The following formula by Roberts may meet with your requirements:

$$D^2 \times L \times n \times R = \text{Horsepower}$$

18000

D = Diameter of cylinder in inches. L = Stroke of piston in inches. R = Revolutions per minute of crankshaft. n = Number of cylinders. This is for four-cycle engines.

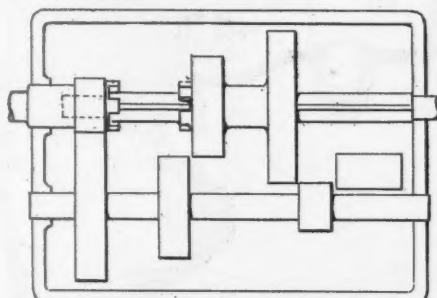
3—A saving in weight and ability to attain higher speed are some of the characteristics which make the short-stroke motor better suited to some phases of motor car work and especially adapted for use in aeronautics. As to the advantage of the long stroke from a standpoint of general economy and wearing qualities, there can be no question, and the short-stroke motor is decidedly in the advantage when the question of weight is considered. Whether or not a long-stroke motor or one of a short stroke is preferable, depends to a great extent upon the use to which the motor is to be put. In motor car service the long-stroke motor is particularly adapted for commercial cars, on which its increased weight and size is of little consequence, while its greater fuel economy and increased lease of life are valuable features. The aeronautic motors which have proven most successful are short-stroke motors. The short-stroke motor for the same power output must run at a higher speed of revolution. The inertia forces in a motor are proportional at equal piston speed to the number of revolutions. These forces and the strains and vibrations which they entail therefore are greater in the short-stroke motor than in the long stroke. The compression chamber of a long-stroke motor is more compact than in a short-

stroke motor, thus assuring a slightly greater thermal efficiency for the former, and, turning at a lower speed of revolution, it is easier to secure in the long-stroke motor a quiet operation of the various accessories, such as the valves, magneto and pump. Some of the advantages claimed for the offset crankshaft are: Less liability of a back kick in cranking; reduced wear on the bearing surfaces of the cylinder walls, connecting rods and crankshafts; less liability of stalling the motor when the car is running slowly on a high gear, and facilities entering into the design and construction of the motor.

4—Yes. The valve-in-the-head motor has been proven to be the most powerful, but not always the most practical.

FOUR-CYCLE DEFINED

Greenview, Ill.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following questions:



A PROGRESSIVE TYPE OF SLIDING GEARSET

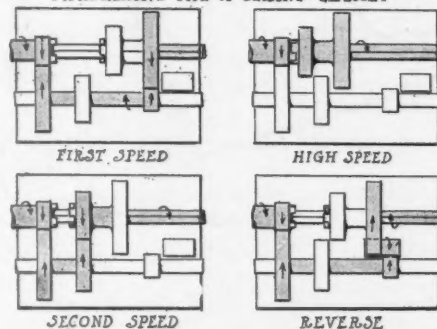


FIG. 2—SPEED CHANGES OF PROGRESSIVE GEARSET

1—Where is Barney Oldfield's Benz car made?

2—Is there any magneto which can be put on the Ford model N and do away with the coil and timer used at first?

3—Where is the flywheel located on the 1910 Winton six, and is it lighter than that used on a four-cylinder of the same horsepower?

4—How is the cycle of an engine determined?

5—How many revolutions does the flywheel make between the explosions in a

EDITOR'S NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

two-cylinder, four-cycle motor car engine?

6—Is there any engine made that can be called a six-cycle?

7—Is it possible to find a dead center on a four-cylinder engine?—Merritt Williams.

1—Oldfield's Benz car was made in the factory of Benz & Co., at Mannheim, Germany.

2—Almost any of the popular types of magnetos generally used for jump-spark ignition are adaptable to the Ford model N.

3—The flywheel on the 1910 Winton six is located at the rear end of the motor and is lighter than the flywheels of ordinary four-cylinder motors of the same horsepower. The fewer the number of cylinders, the heavier the flywheel ought to be to insure smooth running of the engine.

4—The cycle of a motor might be defined as being determined by the number of strokes of the piston required to produce a power impulse from a cylinder. In a so-called two-cycle engine but two strokes or one revolution of the crankshaft are required, since the phases of charge admission and compression are combined in one stroke, and the phases of combustion and exhaust in the other. In the four-cycle engine four strokes of the pistons or two revolutions of the crankshaft are needed for the completion of the four phases.

5—In a two-cylinder four-cycle motor the flywheel makes one revolution for each explosion.

6—Some experimenting has been done with a so-called six-cycle motor, two phases, an aspiration and expulsion of a cylinderful of pure air, following the exhaust stroke, being added to the regular phases of suction, compression, explosion and exhaust. Properly speaking, a two-cycle engine, perhaps, should be called a two-stroke cycle, and a four-cycle engine a four-stroke cycle; but when one understands the distinctions the shorter terms are much simpler.

7—With four cylinders and cranks at



180 degrees there must of necessity be four points in the cycle at which there can be no turning effort other than the momentum or torque stored in the fly-wheel, crankshaft and parts connected thereto; these four points are known as the dead centers. Both two-cycle and four-cycle engines are simply described and illustrated in the October 27 issue of Motor Age on pages 16, 17 and 18.

ADJUSTING STEERING GEAR

Maquoketa, Ia.—Editor Motor Age—Through the Readers' Clearing House, will Motor Age give me directions for adjusting the steering wheel, which has too much lost motion, on my Oakland 40, 1909 model.—W. W. Ogden.

The lost motion in your steering gear is most liable to be due to looseness of the connecting-link joints. Ball joints are used throughout in these parts, and all that is required to adjust them is to clean them up thoroughly with gasoline and a brush, remove the cotter keys from the ball-joint casings, screw in the adjusting plug until the lost motion is eliminated, pack the joints with grease, and replace the cotter pins. If your car has seen hard service and lost motion is present between the steering wheel and the arm at the lower end of the steering column, it will be necessary to dis-assemble the steering gear and perhaps replace a few parts. The internal mechanisms of your steering gear are quite clearly shown in the sectional drawing, Fig. 3. There is a circular eccentric cam K pinned and keyed to the steering column C, which is free to operate in the center of a ring R that has gear teeth on its periphery. The teeth of this ring R mesh eccentrically with the teeth of an internal gear ring G, and at the same time with the internal teeth of the part P, which is located just above it. The internal gear ring R is riveted to the flanges F of a cup-shaped or flared sleeve portion of the shaft T, to which the lower end of the arm A is secured, and your lost motion might be due to looseness of these rivets S or pins, looseness of the arm A on the shaft T, or to worn teeth in the gear parts. In order to give a clearer conception of these parts, plan views of them are shown in miniature at the side, and they may be recognized by letters upon them which correspond to those of the assembled sectional drawing.

MAGNETOS FOR LIGHTING

Toledo, Ill.—Editor Motor Age—Will Motor Age please answer the following in the Clearing House columns: Would it do a low-tension Splitdorf magneto any damage to use it for electric lighting purposes? Where would the wires be attached to the magneto to run to the lamps?—R. F. Stephens.

It will not be successful to use a magneto to furnish current for lamps. The magneto will not produce amperage enough for this purpose. This has been demonstrated more than once.

Practical Instructions in Recharging

Chicago, Ill.—Editor Motor Age—In answer to John J. Yocum's inquiry on page 21 of December 22 issue of Motor Age, I submit the following information on charging storage batteries, which is given out by the H. H. Franklin Mfg. Co., and which will no doubt be of interest to many other readers:

The charging of storage batteries, while it may seem very simple, is in reality an operation which requires considerable skill and experience. A storage battery may be ruined or its output greatly diminished by improper manipulation. Only the best of measuring devices should be used; and

greater than 30, being most convenient.

In charging a battery, the positive wire of the charging circuit is connected to the positive terminal of the battery and the negative wire to the negative terminal. The most satisfactory current for charging is one which can be supplied at a low voltage, as in dynamos especially designed for the purpose, so that it can be regulated at about the total voltage of the batteries to be recharged, which is in the neighborhood of 6 or 8 volts for two batteries. To charge the battery, it is necessary to raise the voltage of the dynamo to a greater value than that of the

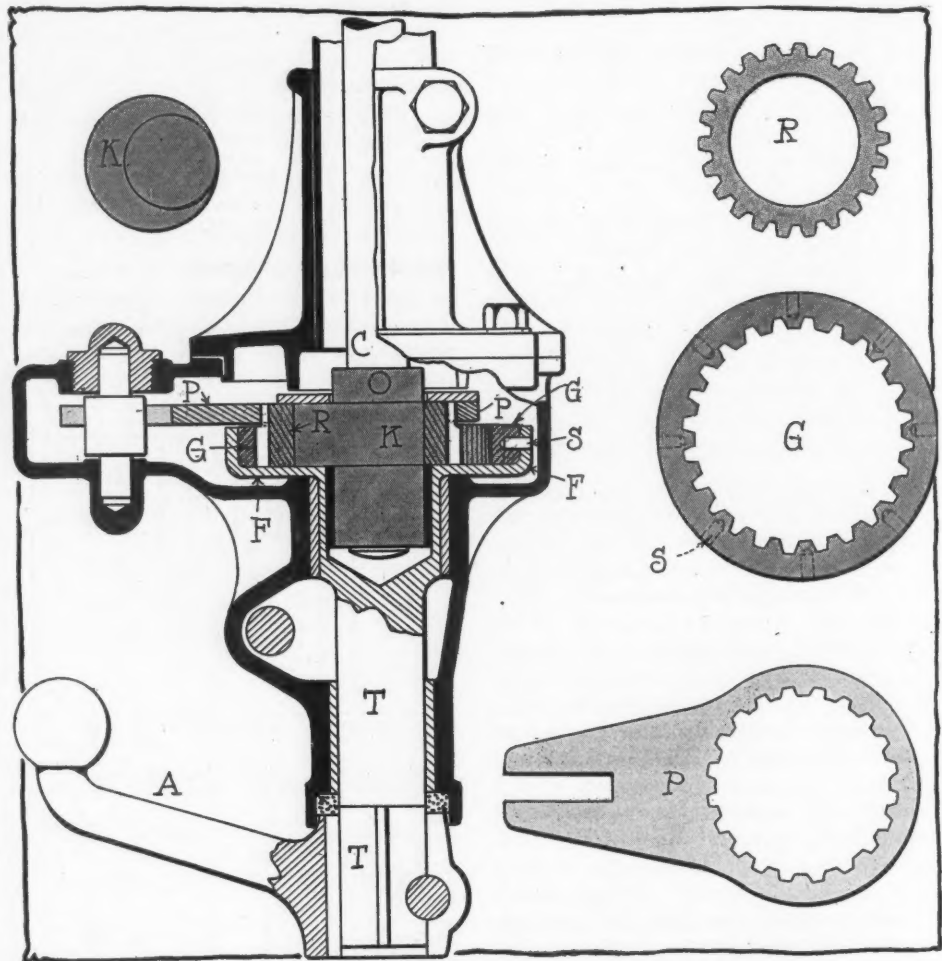


FIG. 3—INTERNAL MECHANISM OF OAKLAND STEERING GEAR

wherever possible, it is strongly recommended that the recharging of storage batteries be left to one skilled in the operation.

Storage batteries may be charged wherever a direct current is obtainable. They cannot be charged from an alternating current unless some kind of a rectifier is used, which is hardly worth considering unless much charging is to be done. Suitable meters are also necessary, a direct reading ammeter having a maximum rating of not fewer than 3 and not greater than from 10 to 15 amperes, depending upon the accuracy of the meter, and a direct-current voltmeter having a maximum voltage of not fewer than 10 and not

battery, placing the low-reading ammeter in the circuit as shown in Fig. 4 and regulating the current according to the instructions as given below. One should bear in mind that if the voltage of the charging dynamo is less than that of the battery, the ammeter will indicate that a current is flowing, but it will be in an opposite direction and the battery will be discharging through the dynamo. Be sure the ammeter pointer does not read backwards.

If the operator cannot get a low-voltage dynamo for charging purposes, it will be necessary to place some kind of a variable electrical resistance in the circuit to prevent a destructive current from flow-

And Care of Storage Batteries

ing, due to the higher voltage. For this purpose, the best thing to use would be a set of incandescent lamps placed in the circuit as illustrated in Fig. 4. The necessary number and capacity of these lamps depend on the voltage supplied and the current required. The following instructions will assume that 16-candlepower lamps are to be used; if 32-candlepower lamps are to be used, twice as much current flows through the batteries, and any other candlepower lamps will change the current according to the same ratio, as shown by the ammeter.

Sketch A assumes voltage of 110, the

about 550. In this case, five times as many 110-volt lamps as in A are needed, connected in sets of five each. Each set gives $\frac{1}{2}$ ampere. The above values are more or less approximate.

The number of lamps necessary for any intermediate voltage can be calculated in the same manner. When lamps are used on a high-voltage, one or more batteries can be charged at the same time, provided they are connected in series as shown in the diagram; that is, the positive terminal of one battery being connected to the negative terminal of the other battery. If a low-voltage charging dynamo is used with-

quired height by adding distilled or pure water. Never add acid except when the battery is fully charged. The acid should test 29 degrees Beaume, or 1.250 degrees specific gravity, after the battery is fully charged. The hydrometer, by means of which this is tested, is usually a glass tube, with an enlargement at the lower end containing mercury. This should be allowed to float in the acid, and the division on the graduated scale of the tube at the level of the acid indicates the specific gravity. Adding water lowers the hydrometer and adding acid raises it. An operator who looks after his own batteries should provide himself with a hydrometer; one about 5 or 6 inches long, having a scale division especially marked for storage battery charging, is the most suitable.

Charging: Connect the wires according to the above instructions. See that the acid is above the tops of the plates. If a very low-voltage dynamo is used as mentioned above, reduce the voltage to a value about 2.5 times the number of cells; then close the switch and raise the voltage until the ammeter reads about 3 amperes; at the same time the voltage and current are increasing together. With an increase of voltage the current may at first decrease to zero and then afterwards increase.

When the higher voltage dynamo or electric circuit is used with the lamps, the current should likewise be adjusted to 3 amperes, or as near as possible, by adding or removing a lamp from the number specified in the diagram if found to be necessary. It will be noticed that as the current is allowed to flow, the voltage across the terminals of each battery will gradually increase; the increase being indicated by the voltmeter placed as in the diagram. When this voltage reaches 2.5 on each battery, reduce the current flowing to 1 ampere. If you are using the low-voltage charging dynamo, this current is lowered by simply decreasing its speed. If the high-voltage dynamo or electric light circuit is being used, with lamps as a resistance, by decreasing the number of lamps, as indicated in the diagram, the current may be lowered. This will also cause the voltage across each battery to decrease. Allow this 1 ampere to flow until each battery again gives a voltage of 2.5 per cell and the batteries will then be fully charged.

If the best service is to be obtained, batteries should be charged at least every week or so, whether they are in use or not. If they are to be left unused for any length of time, they should receive the following treatment before leaving: See that they are fully charged, then syphon off the solution, called electrolyte, and replace with pure water. Then discharge in this condition through suitable resistance until practically all the charge is removed. Allow the battery to stand for 36 hours in this condition, discharging wires disconnected.—A. M. Erika.

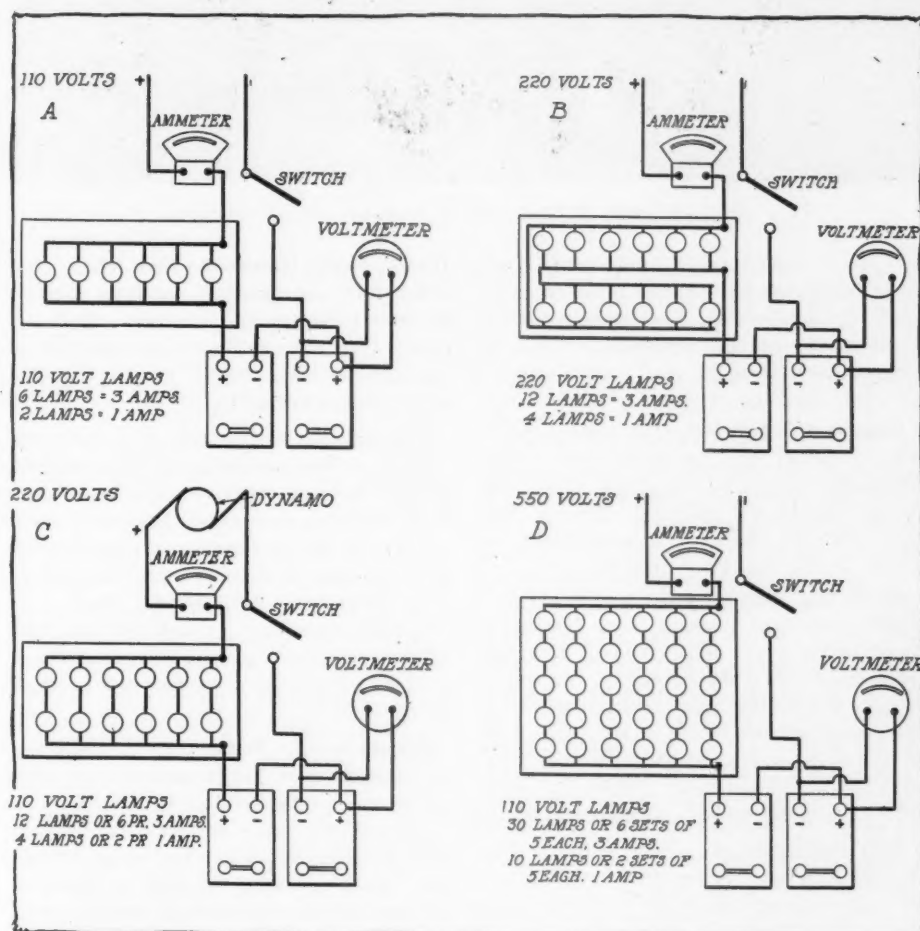


FIG. 4—METHODS OF APPLYING RESISTANCE IN CHARGING BATTERIES

voltage most liable to be met with. Lamps of 110 volts should be used, and each lamp used, connected according to the illustration, allows $\frac{1}{2}$ ampere to flow through the battery, two lamps would mean 1 ampere, and six lamps 3 amperes, etc., as shown by the ammeter.

Illustrations B and C assume a voltage is supplied at 220. In B, 220-volt lamps are used, each allowing $\frac{1}{4}$ ampere to flow—requiring 12 to give a current of 3 amperes, and 4 to give a current of 1 ampere. In C, 110-volt lamps are used, requiring the same number as in B, but connected in pairs as indicated, each pair taking $\frac{1}{2}$ ampere.

Illustration D assumes a voltage of

out lamps, the number of batteries that can be charged at one time is limited to a number whose total voltage is less than the maximum of the dynamo. For example, if the maximum voltage is 15, the number of single cells, at 2.5 volts each, should not exceed four.

Acid: Sulphuric acid is used, which should be chemically pure. Always examine the solution before charging and see that it covers the tops of the plates. To examine the acid and refill the cells, remove the rubber vent caps and use an acid syringe and hydrometer. If, upon examination, you find the acid below the tops of the plates and the battery is in a discharged condition, bring the acid up to the re-

CUP to Lexington—The contest committee of the American Automobile Association has reversed the finding of the referee in the Kansas Magazine run out of Wichita and has given the cup to the Lexington, which was driven by John M. Kirkwood. Originally the Cadillac had it.

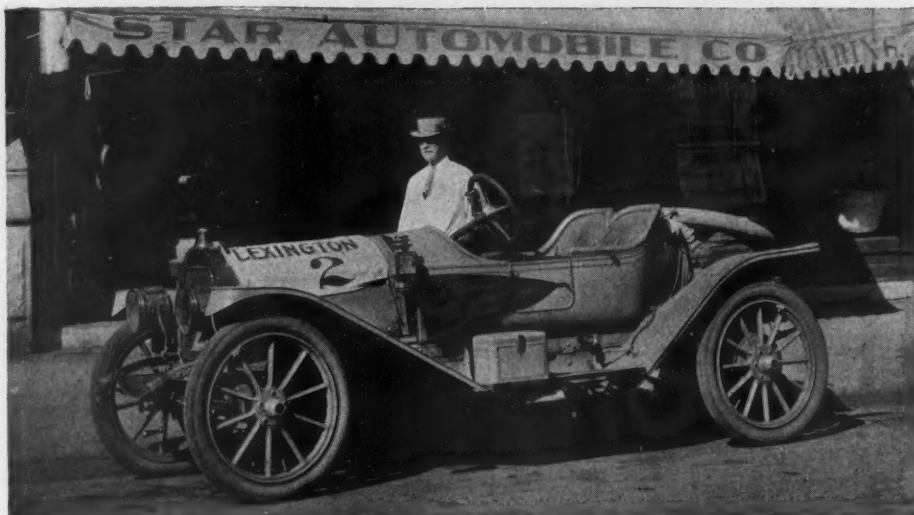
After 600 Members—The Automobile Club, of Syracuse, N. Y., is making a heroic effort to get its membership up to the coveted 600 within the coming fortnight. As the membership is already close to that figure, the workers are confident of winning out in their attempt. As soon as the 600 are secured the club will begin working for 700, and so on.

Coast Wants the Glidden—That the Pacific Highway Association will cooperate with the Automobile Club of Southern California in securing for the Pacific coast the Glidden tour for the coming year is shown by the fact that the officials of the P. H. A. have written the American Automobile Association and other people who control the classic, urging them to hold this event on the Pacific coast or at least include some far west city in the itinerary of the route.

After Uniform Streets—The socialist administration at Milwaukee, Wis., has commenced a scheme to make all roadways in residence districts 24 feet wide. All new streets laid out are being made 24 feet, and the existing streets over this limit will be reduced as soon as practicable. The aim is to make residence streets uniform and to reduce the cost of construction and maintenance. While motorists prefer wider streets than 24 feet, they feel that the promise of good streets, if not so wide as desirable, is a compensating feature of the socialist plan.

Demand Road Legislation—A strong demand for better roads in Nebraska is becoming so prevalent that this will be one of the important pieces of legislation to be enacted by the legislature which convened this week. With the river-to-river road in Iowa, which has attracted so much favorable comment there, and the reports of tourists, and Gliddenites, that the roads of Kansas are at present better than those of Nebraska, the people of the latter state are realizing that some new legislation is needed. One of the bills that will be introduced into the legislature provides for a highway from Omaha to the west line of the state, running along north of the Platte river, and touching the western border on the road to Julesburg, Colo. The idea would be to secure the cooperation of Colorado and Wyoming, and put a good road through to Cheyenne, or beyond, which, joining with the river-to-river road, would make a fine highway as far east as Illinois. It is thought that when the Panama exposition is held at San Francisco in 1915 there will be hundreds of cars headed in that direction. If this road is completed by that time, it will mean that they will adopt this route. This route was followed by the Glidden

From the



LEXINGTON CAR AWARDED THE KANSAS MAGAZINE CUP

tourists in 1909, but it was not the best bit of road that they encountered on their tour, by considerable. The proposed route would pass through Fremont, Columbus, Central City, Grand Island and Kearney, Neb., among other cities.

Federal Bill Renewal—The federal registration bill of the American Automobile Association may be reported after the holiday recess of congress. This is the expectation of Chairman Charles Thaddeus Terry, of the legislative board.

Good Tag Business—Up to January 1, 10,000 motor car licenses were issued by Ohio for the year 1911. A large force of clerks was necessary to handle the extra work. When the new incumbent takes possession of the office about one-third of the licenses for the year 1911 will be issued. Registrar Caley estimates that 40,000 registrations will be issued in 1911.

Michigan Election—At a meeting of the Michigan State Automobile Association the following officials were present: President, E. A. Skae, of Detroit; vice-president, J. R. Jackson, of Grand Rapids; secretary, F. C. Jackson, of Grand Rapids, and treasurer, J. J. Ramsey. Chairman George, of the good roads committee, introduced a resolution recommending to Governor-elect Osborn that he make Horatio S. Earle state highway commissioner, also recommending the employment of convict labor for the improvement of public highways. Both resolutions were passed. The secretary brought up a proposition for increasing the membership by taking in individual owners of cars. He hopes to increase the membership to 5,000 by this plan. If this mark is reached it will mean an additional fund of \$10,000, which will be used in road improvements and the placing of sign posts along the country roads. Lines of sign posts have already been established from Detroit to Jackson,

Battle Creek, Kalamazoo and Niles. Another line has been set up from Detroit to Grand Rapids and Holland. Still another line will extend from Detroit to Saginaw, and eventually the purpose is to cover the entire state.

Getting Busy—The county road commissioners are preparing for the construction of several miles of permanent macadam roads in Genesee county, Mich., next summer by the purchasing of a quantity of road building machinery and the making of a contract for 6,000 tons of stone. The commissioners have purchased a road roller, sprinkler, four spreader wagons, a grader and some scrapers at a total cost of \$4,000.

Housewarming Postponed—The Milwaukee Automobile Club found it impossible to have the housewarming of its new country home near Milwaukee, Wis., on Sylvester eve, December 31. Interior work has been progressing so rapidly, however, that it is probable that the opening will be held about January 25. The building is 150 by 100 feet in dimensions, two stories high and represents an outlay of \$15,000.

Helping the Cause—In the reports of County Engineer Hugh K. Lindsay and the board of county commissioners of Franklin county, Ohio, considerable is said concerning the good roads movement in central Ohio. During the calendar year more than \$200,000 was spent in road building and improvement in the county alone, an amount 23 per cent larger than was spent in the previous year. As a result of the expenditure of this amount of money, the roads of the county are in much better condition. Engineer Lindsay spent considerable time overseeing the work of contractors in road building and he assures the people that the money spent

Four Winds



CADILLAC WHICH BROKE SAN FRANCISCO-LOS ANGELES RECORD

was to good advantage. Another step towards permanence in the movement is the provisions made by the commissioners for repairs. It is proposed to make the county the road builder in the future, although this may not be done next season.

Marshall Will Run Show—At a meeting this week the show committee of the Syracuse Automobile Dealers' Association selected William R. Marshall as manager for the 1911 show to be held at the state armory, Syracuse, N. Y.

Swiss Guards for Show—A brilliant feature of the show in Madison Square garden, January 7 to 21, and one of historic interest, will be the presence of fifty attendants attired in the full regalia of the famous Swiss Guard of the vatican during the eighteenth century, when they were the bodyguard of the pope. The jackets and trousers are of a brilliant scarlet hue. A cap with a red crown, heavy white stripes and a crow-black peak, and black leather puttees complete the outfit. In the foyer of the garden the attendants, ticket takers and others will be uniformed in a costume in keeping with the decorations that will grace the entrance way.

Show Interest in Roads—The new legislators of the Black hills counties, South Dakota, were present at a meeting called by the Deadwood Commercial Club to discuss measures that would come before the next legislature, especially good roads legislation. The demands of this section of the state on this point will be amendments to the law eliminating the road supervisor, and substituting an expert engineer to have charge of all road building in each county and providing an adequate method for building permanent roads. It was argued that a different system was necessary for good roads in the the state, because of the different condi-

Black hills than in the eastern section of tions. A bill will be introduced providing for a macadam road through the hills, taking in all the principal towns, both north and south, and extending into Wyoming as far as the Devil's tower.

Asks for Model Road—The Ashland County Good Roads Association has asked the county board of supervisors to build the proposed model road from Ashland, Wis., to Glidden, Wis., next year. Ashland is one of the tier of northernmost counties in Wisconsin, and the country is still wild.

After a Place—Spokane promoters and supporters of the international race meeting, for purses aggregating \$40,000, in Spokane next summer, are enthusiastic boosters for the grand circuit of speedways and they will urge the projectors to include Spokane in the circuit, pledging financial and other support to the plan.

Wisconsin Statistics—Up to December 31, 1910, the secretary of state of Wisconsin has issued 6,160 licenses for the year, or a total of 15,993 since the registration law went into effect. At \$2 per license, the total fees to the state for 1910 amounted to \$12,320. There are 370 licensed dealers in the state, who pay a fee of \$5 each.

Ferguson's Record—Ernest L. Ferguson, who is the official representative of the American Automobile Association, is conducting the present New York to San Francisco pathfinding tour of the Ohio car, passed the 75,000-mile in his career as a motorist when the car reached El Paso, Tex., on December 23. His interest in motoring began in 1895, and since that time he has acted as the executive official of eight successive Glidden tours and of the two Munsey tours. His actual mileage traveled in a motor car would more than

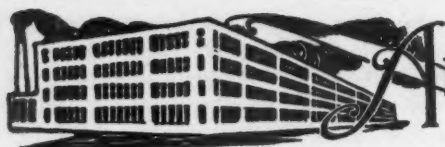
equal three circuits of the globe. When the Ohio car, in which Mr. Ferguson is establishing a new route between the coasts by way of the southern states, reaches San Francisco he will have exceeded, as far as the records of the American Automobile Association show, the touring record of any other motorist in this country, it is claimed.

Shearer Succeeds Caley—J. J. Shearer, of Ashland, O., has been named to succeed Fred H. Caley as state registrar of motor cars in Ohio. Caley, who has been selected general manager of the Cincinnati Automobile Club, will not take up his new duties until January 15, and will be at the registrar's office to help the new registrar become familiar with the duties of the position.

Milwaukee Decorations—An elaborate decorative scheme has been provided for the third annual Milwaukee show in the Auditorium from January 14 to 20, by the Milwaukee Automobile Dealers' Association, which will cost in the neighborhood of \$5,000. A colonnade of U-shape, extending nearly around the great arena of auditorium main hall, will be supplemented by a square colonnade on the stage, which will accommodate about six exhibitors.

Club in Good Shape—The Bay State A. A. has started off on a new era thanks to the reorganization committee that for a year has been running the club affairs. Now instead of a big debt and a lot of expenses it is practically free and everything looks prosperous. The club is in better shape than it has been for years. At the meeting last week a new set of officers were elected. E. A. Gilmore was chosen president. He was secretary of the committee. Harry Knights was made vice-president, J. S. Hathaway treasurer. C. P. Rockwell was elected secretary. The directors comprise Moses H. Gulesian, Chase Langmaid, A. B. Henley, Burton G. Ellis and Major Horace G. Kemp. All these officials were chosen by the committee and they were elected unanimously.

Would Amend Law—Ernest R. Moore of Cedar Rapids, Ia., representative from Linn county, will introduce a bill into the general assembly, early in the session, providing for many changes in the motor law. His measure will call for a tax on every machine, according to its horsepower. This tax is to be paid to the state auditor, and then the money reapportioned to the road districts for the improvement and maintenance of good roads, with a premium provision for those counties that built permanent roads. Another section provides for the examining, licensing and taxing of every person who operates a car. It is claimed that many drivers thrown out of employment in other states, where drivers have been licensed, are now running cars in Iowa. Another provision makes it a felony punishable by imprisonment if a person runs down another, and does not stop.



Among the Makers and Dealers

HOUPT Handling Alcos—Harry Hout, of New York, has become manager of sales of Alco cars in the metropolitan district.

Robertson a Tradesman—George H. Robertson has definitely retired from racing and gone into business. He has acquired a one-third interest in the Auto Supply Co., of New York, and been elected president of the concern.

Employees' Aid Association Growing—The Velie Motor Vehicle Employees' Aid Association, organized in November, 1909, showed a gain in membership during the last year of 100 at the December meeting recently held. The list now numbers 400. The financial statement of the last year shows total receipts of \$1,221 and disbursements of \$944. Officers elected at the December meeting were: President, J. D. Williams; vice-president, George Serganty; secretary, George L. Boomer; treasurer, M. F. Smith.

Brooklyn Show Plans—The motor car dealers in Brooklyn are busily engaged making preparations for their initial show. Although the show, which is to be held in the Twenty-third Regiment armory, Brooklyn, from January 18 to 25, is more than a month distant, the active work of the Brooklyn Motor Vehicle Dealers' Association is already bearing fruit, and spaces have been allotted for the display of thirty-one different makes of cars. From present indications it is certain that more than fifty different makes of cars will be on view.

General Motors' Report—The condition, business and financial, of the General Motors Co., is in a gratifying condition, according to a statement just issued to stockholders in the nature of a prospectus giving various facts of interest. The prospectus is also relative to the \$15,000,000 issue of 6 per cent first lien 5-year sinking fund gold notes. The paper also contains the report of Marwick, Mitchell & Co., New York, chartered accountants, upon the condition of the General Motors Co., according to September 30, 1910. The General Motors Co. is credited in the report with assets amounting to approximately two and one-half times the amount of the note issue, without figuring in the account other assets carried on a book value of \$7,663,939.90, as to the actual value of which the accountant expresses no estimate. The accountants report that, under date of November 14, the company has received the proceeds of its note sale and paid off contingent liabilities amounting to \$600,000, completing the purchase of stock of one of its subsidiary concerns, thereby releasing and receiving back into the treasury \$600,000 of its own preferred stock, which had been pledged in the deal.

According to the prospectus the General Motors Co. now has assets of about \$24,147,000, \$3,000,000 of which is in cash.

Langhorne Truck Manager—J. T. Langhorne has been made manager of the truck department of the Packard Motor Car Co. Mr. Langhorne is an old truck man, having sold Frayer-Miller trucks in Boston before becoming associated with the Packard, and more recently, in order to gain a thorough knowledge of the Packard truck business, has been assisting the truck department of the Packard Motor Car Co., of New York, and various Packard dealers throughout the country.

Cash Prizes for Cleanliness—Foremen of the Timken-Detroit Axle Co. participated in the first distribution of prizes awarded by the company in accordance with the terms of a contest announced November 9 to promote cleanliness of plant and equipment and care of the latter. The awards for cleanliness were: First, \$25, drill press department, Ben Wilson, foreman; second, \$20, gear-cutting and grinding department, Harry R. Huber, foreman; third, \$15, stock department, Charles R. Mumaw, stockkeeper. Consolation prizes of \$5 each for excellence were awarded the milling machine department, Leonard E. Bauer, foreman; hub department, Herbert Clark, foreman; shipping department, John B. Nugent, Jr.; rough grinding department, Ben Fahndrich, foremen; front axle department, C. F. Gazley, foreman; tool room, Edward A. Searles. The company seeks suggestions from employees concerning the introduction of economies in manufacturing, shortening

time of production or improvement of methods. Payment is made for the best suggestions.

Will Be Called Uncas—It has been decided to characterize all specialties built by the Uncas Specialty Co. as the Uncas ignition specialties and all of its manufacturing plants will be known as the Uncas distributor, Uncas timer, etc.

New Pittsburg Concern—The Penn Motor Co., of Pittsburg, has been formed with a capital of \$150,000 by A. G. Breitweiser, president; P. J. Keeling, treasurer, and E. E. Gregg, secretary and sales manager, and J. S. Herbert, chief engineer. The company owns a big factory building in Thomas boulevard, East End, which will be enlarged and converted into a modern plant which will have floor space for making 2,000 cars a year. Three models will be built. The work of remodeling its building will be completed December 15.

Santa Claus at Moline—Paid-up accident insurance policies were the Christmas presents that 1,500 employees of the Velie Motor Vehicle Co. and the Velie Carriage Co. found in their pay envelopes on the pay-day before Christmas. The policies are good for 1 year from date and covers accidents due to such causes as wrecks of public vehicles, in addition to those occurring while the men are at work in the shops. Two years ago W. L. Velie, president of the two Velie concerns, conceived the idea of giving to each foreman and assistant foreman in the plants a 20-year life endowment policy, on which the companies would pay the yearly premiums.



GARAGE OF YAGER MOTOR CAR CO. OF LOUISVILLE, KY.



WHERE THE E-M-F IS HANDLED IN OMAHA

This plan proved so satisfactory that it was decided to inaugurate the accident insurance policy disbursement of this year.

Aplco Company Enlarges Plant.—The Apple Electric Co., of Dayton, O., has increased the size of its factory, moving the storage battery and repair departments to a large room in the Buvinger building, a short distance from the main factory. The new room offers better facilities for repairs and installations, as it is on the ground floor and is equipped with conveniences for the work.

Changes Name.—A meeting of the stockholders of the Dayton Electromobile Co. decided to change the name of the company to the Dayton Electric Car Co. Subsequently the board of directors elected the following officers: J. L. Baker, president; L. G. Battelle, vice-president and sales manager; H. G. Brentlinger, secretary and treasurer. In addition to the above officers, William Pflum and C. W. Dale will serve on the board of directors.

Klaxon Change.—With the coming of the new year the Klaxon company, which has handled the Klaxon and Klaxonet warning signal sales from the first, becomes a memory. All shipping, selling and billing will hereafter be direct from the factory of the Lovell-McConnell Co. at Newark, N. J., the home of the Klaxon. W. O. Turner, who has been manager of the Klaxon company, becomes secretary of the Lovell-McConnell Co., and will take entire charge of the sales and offices. A 1911 project of the Lovell-McConnell Co. blazes the way for a new business method. All 1911 jobbers' contracts include an agreement to maintain sales list prices. This means that even if the jobber bought in thousand lots, he could not sell a hundred, or ten, or five Klaxons at any less

figure than they could be bought from the factory in the same quantities. No other manufacturers, so far as known, places such a restriction upon jobbers.

Sternberg Plant Ready.—The Sternberg Mfg. Co., motor truck builder at Milwaukee, Wis., is about to occupy its new plant at Forty-sixth avenue and Rogers street.

Petrel Dividend.—A final dividend of 15 per cent has been declared in favor of creditors of the Petrel Motor Car Co., of Milwaukee, Wis. At the time of the bankruptcy petition the Filer-Stowell Co., of Milwaukee, purchased the plant and is now producing the Petrel friction-drive car in large quantities. The reorganized company is also known as the Petrel Motor Car Co., owned by the Filer-Stowell Co., a big machinery manufacturer and owner of the Beaver Mfg. Co., builder of motors for pleasure and commercial cars. The present Petrel company is under an entirely new management.

Alden Sampson Election.—The same officers as headed the Alden Sampson Mfg. Co. for the past year will remain in charge during 1911. They were named at elections held in New York. It was voted to add the title of assistant treasurer to the present officers. The following were elected: President, Benjamin Briscoe; vice-president, Morris Grabowsky; treasurer, Frank Briscoe; secretary, G. E. Mitchell; assistant treasurer, Fred C. Winckler. S. B. Dusinger, it was announced, will be placed in charge of the touring car division. Mr. Dusinger is assistant general manager. With the Detroit shops practically completed and the Pittsfield, Mass., factory tripled in capacity, the manufacturing area of the Sampson company will total 266,835 square feet. The Sampson company will build a line for 1911 ranging from the 1,000-pound

light delivery motor to the 5-ton size. The intermediate sizes are the 1-ton, the 2-ton, the 3-ton, and the 4-ton.

More Land for Gear Company.—The Collins Gear Motor Co., of Pittsburg, which took over the plant of the Simpson Stove and Mfg. Co., at Canonsburg, Pa., a few months ago, has secured additional land and is now arranging to build a plant 60 by 300 feet. The company has its charter and plans are being prepared for the building. President D. P. Collins, of Pittsburg, announces the plant will employ 100 men at the start.

New Detroit Deal.—An arrangement was consummated last week by which the entire output of the Pontiac Foundry Co., of Pontiac, Mich., will be disposed of through Claire L. Barnes & Co., which sales company also handles the output of Billings & Spencer, drop forgings and tools, and E. B. Wagner Mfg. Co., die castings. The Pontiac Foundry Co. is one of the group of new concerns known as the Flanders projects, because of the fact that the president of the E-M-F company is a large shareholder and the other members of the concern are former associates of Mr. Flanders in that company.

Freight Cars for Motor Use.—The growth of the motor industry is hardly better illustrated than by the figures issued by the Chicago, Milwaukee and St. Paul railway, which show that 1,200 freight cars designed exclusively for hauling motor cars were built for that road in its shops at Milwaukee, Wis., during 1910. The Burlington has placed 500 into service, and the other principal western roads sum up as follows: Great Northern, 1,000; Canadian Pacific, 100; Grand Trunk, 500; Soo line, 100; Pennsylvania lines west, 500; Wabash, 250; Union Pacific, 500; Southern Pacific, 300; Missouri, Kansas & Texas, 400. The cars average 80,000 pounds capacity. The Union Pacific, Pennsylvania and Southern Pacific cars are of 100,000 pounds capacity.

Rambler Policy.—The attention of the public has recently been attracted to the publication by the Thomas B. Jeffery Co. of a statement of the policy governing all of its relations with Rambler owners, Rambler dealers and with prospective customers. The statement of the Rambler policy follows: To make all parts for the Rambler, and by limiting the output to make them so carefully that the Rambler may justly deserve distinction as a car of character and quality; to be exact in all statements—never to misrepresent or exaggerate and never to disparage others; to be guided by the experience of many years and to value permanent rather than temporary success; to maintain independence as a safeguard to stability, and to assure to customers the perpetuation of this policy; to serve every Rambler owner so promptly, courteously and thoroughly as to assure to each the pleasure and satisfaction he expects.

COLFAX, Wash.—George Cornelius has secured the Chalmers agency at Colfax.

Boston, Mass.—E. G. Tobin has joined the sales force of G. E. & H. J. Habich Co., New England distributor for the Cole.

Smith Centre, Kan.—The Fawcett-Rinehart Auto Co., successor to Charles L. Fawcett, after April 1 will be located in a new garage 56 by 80 feet.

Attleboro, Mass.—A. Edwin Batzell, formerly with the United Manufacturers of New York City, is now representing the Frank Mossberg Co. of Attleboro, Mass.

Boston, Mass.—Bert A. Vance, Sycamore street, New Bedford, has closed with the G. E. & H. J. Habich Co., of Boston, for the agency for the Cole in New Bedford and vicinity.

Columbus, O.—T. R. Minshall, who has been general manager and treasurer of the Early Motor Car Co., has severed his connection with that concern and will take up business in Boston.

Dayton, Ohio—The C. W. Raymond plant, located at the corner of First and Taylor streets, is now the property of the Dayton Auto Truck Co. R. T. Johnson is president and G. B. Aldrich general manager.

Ashtabula, O.—The H. Bieder Mfg. Co. has been incorporated with an authorized capital of \$10,000 to manufacture and sell gasoline engines and supplies by H. Bieder, F. A. Mason, Mrs. M. E. Mason, Lizzie J. Bieder and A. Roth.

Denver, Colo.—M. B. Urquhart, northwestern manager for the Keystone Lubricating Co. of Philadelphia, Pa., manufacturer of Keystone grease, has moved his offices from the Century building into the new First National Bank building.

Boston, Mass.—W. L. Russell, who has the agency in Boston for the Apperson cars, has taken on the Regal, which recently discontinued its branch. He has moved down to Park square, where the Regal had its salesrooms. George W. Tufts, formerly with the Hupmobile, has gone with him as salesman.

Toledo, O.—The Diamond Rubber Co., of Akron, O., will open a branch store in Toledo. Rooms have been secured in the Colton building at 710 Madison avenue. All adjustments will be made here and a stock will be maintained large enough to supply the trade. C. W. Green will have charge of the local store.

Milwaukee, Wis.—The eastern interests in the Aluminum Goods Mfg. Co. of America have been purchased by the Vits family, of Manitowoc, Wis., and the head offices will be removed to Manitowoc from Newark, N. J., where they have been located since the Two Rivers Aluminum Co., Aluminum Novelty Co. of Manitowoc and Newark Aluminum Co. were consolidated a year ago. The Newark factory will be moved to Manitowoc and the plants in that city and at Two Rivers will be enlarged, making it one of the largest concerns of the kind in the country.

Brief Business

larged, making it one of the largest concerns of the kind in the country.

Dixie, Wash.—Paul Thorney has taken the Rambler agency for Walla Walla county.

Norwalk, O.—The announcement is made that the Norwalk Motor Car Co. is to be refinanced by \$100,000 of additional capital.

Trenton, N. J.—The Stoddard-Dayton Automobile Co. has opened its new headquarters at 27-29 North Warren street, with Norman F. Druck as manager.

Boston, Mass.—Augustus B. Henley, recently with the Franklin Automobile Co., accepted the position of manager of the truck department of the D. P. Nichols Co., who handles the Frayer-Miller.

Lima, O.—The sales department of the Gramm Motor Truck Co. has been moved from Bowling Green to Lima with H. W. Moore in charge. Machinery in the new plant is practically all installed and in a short time the factory will be in full operation.

Boston, Mass.—Lin McKie has approved plans for a model concrete garage to be constructed on Liverpool street, East Boston. It is expected that the garage will be completed by May 1. Mr. McKie will represent the Velie on Noddle island.

Kenosha, Wis.—The Kent Motor Car Co. has purchased a site for a large new garage building on Park avenue, with dimensions of 80 by 120 feet. The site is on the direct route from Chicago to Milwaukee via Kenosha. The garage will be built at once and is expected to be ready on June 1.

Detroit, Mich.—The Oliver Motor Car Co., of Detroit, has appointed Robert G. Pilkington chief engineer. Mr. Pilkington formerly was chief engineer for the Stanley Power Wagon Co., of Detroit, and before that chief engineer of the gasoline commercial car department of the Studebaker company.

Grand Rapids, Mich.—Carl Palmer, who has been connected with the Riley Auto Co. for some time, has severed his relations with that concern and will handle Peerless motor cars exclusively during the coming season. He will continue to make his headquarters at the Riley garage on Division street.

Milwaukee, Wis.—The Milwaukee Motor Co. has increased its capital stock from \$50,000 to \$250,000, which stock has been taken by its stockholders and none is offered for sale in the market. The Milwaukee Motor Co. has put in almost an entirely new machine tool equipment in its factory, and at this time has a plant with a floor space of something over 50,000 square feet, entirely given up to the manu-

facture of engines, solely for motor cars, marine, truck and traction work.

Boston, Mass.—The Monogram Oil Co. has moved its Boston branch from Boylston street to Massachusetts avenue.

Indianapolis, Ind.—J. V. Thomas has become associated with the sales force of the American Motor Car Co., of Indianapolis.

Salina, Kan.—Earl V. Shue, who has been handling Cadillac cars for the past 2 years at Des Moines and also a short time at Salina, has severed his connections with the Cadillac company and will engage in the wholesale motor car business.

Spokane, Wash.—During the past week the Regal Garage Co. moved into its new Sprague avenue garage and salesroom. The Regal garage branch at Dayton, Wash., is soon to be fitted with new machinery similar to that installed at the Spokane plant.

San Andreas, Cal.—A 10-acre site was purchased on the Haggin grant near Sacramento for a motor car manufacturing concern soon to be established. The company, which is headed by E. C. Collins, J. H. Graham, Charles E. Gibbs and T. F. Cooke, promised to begin the manufacture of cars next May, and by that time \$250,-

The Show Circuit

- December 31-January 7—Grand Central Palace show, New York.
- January 2-7—Importers' show, Hotel Astor, New York.
- January 7-14—First week of A. L. A. N. show in Madison Square garden, New York.
- January 14-25—Show in Brussels, Belgium.
- January 14-28—Show of Philadelphia Automobile Dealers' Association, Philadelphia, Pa.
- January 16-21—Second week of A. L. A. M. show in Madison Square garden, New York.
- January 16-21—Show in Wayne pavilion, Detroit.
- January 14-18—Show at Milwaukee, Wis.
- January 25-28—Show in Auditorium, St. Paul, Minn.
- January 27-February 4—Show at Vancouver, B. C.
- January 28-February 4—First week of national show in Coliseum, Chicago.
- February 5-11—Show at Buffalo, N. Y.
- February 6-11—Second week of national show in Coliseum, Chicago.
- February 13-18—Show at Winnipeg, Canada.
- February 13-18—Show of Kansas City Motor Car Trade Association.
- February 13-18—Show at St. Louis, Mo.
- February 13-18—Show in Convention hall, Washington, D. C.
- February 14-19—Show at Dayton, O.
- February 15-18—Show at Grand Rapids, Mich.
- February 18-25—Show at Minneapolis, Minn.
- February 18-25—Show at Binghamton, N. Y.

Announcements

000 will be spent on buildings and machinery for the plant.

Colville, Wash.—The Columbia garage has secured the agency for the E-M-F cars in this city.

Albuquerque, N. M.—The machine shop and garage of Knowles & Rowlands is ready. It is a brick building, two stories, 44 by 82.

Seattle, Wash.—West & Hollingsworth have taken the agency for the Maxwell and Pennsylvania cars in Seattle and have rented the garage at 1420 Broadway.

New York—The Motors Engineering and Sales Co. has moved into its new quarters at 250 West Fifty-fourth street. The company has the agency for the Kelly truck.

Spokane, Wash.—E. A. McGoldrick has entered the Spokane field, securing the agency for the Empire. He will also handle a line of trucks and the Curtis motor boats at 517 Sprague avenue.

Columbus, O.—At a meeting of the stockholders of the Portage Rubber Co., held recently, it was determined to increase the capital stock of the company from \$10,000, the nominal capital, to \$1,000,000. The board of directors determined to award contracts at once for doubling the capacity of the plant at Barber-

ton, O. W. W. Wildman is in charge of the plant at Barberton.

Wallace, Idaho—Willis Boggs has opened the first garage in Wallace and will handle the Chalmers.

Indianapolis, Ind.—The Brosius-Sesline Automobile Co., of Fort Wayne, has changed its name to the Brosius-Hoeker Automobile Co.

Boston, Mass.—The Davis Automobile Sales Co., agent for the Lexington in Boston, has moved into its new home in the Motor Mart on the Church street side.

Buffalo, N. Y.—Edgar Lowenthal of Lowenthal & Co., Buffalo, representatives of Vickers Sons & Maxim's Elco high-speed steel, has returned from a 6 weeks' visit at the works in Sheffield.

Salem, Ore.—A. E. Eoff will act as sub-agent for the Knox, Premier and Moline cars in Marion and Polk counties, while Fenz Bauer will hold the same position at the Dalles, Ore., for Wasco county.

Wichita, Kan.—The Auto Supply and Tire Co., now located at 143 North Market street, is having a modern building erected at 225-227 South Lawrence avenue, from which place it will continue its jobbing business in Firestone tires and motor supplies.

Boston, Mass.—Through Morton H. Luce, manager of the New England branch of the Velie Motor Vehicle Co., contracts have just been closed with Hernandez & Barasorda, one of the largest commission houses of San Juan, for the agency of Velie motor cars on the island of Porto Rico.

Philadelphia, Pa.—Hereafter the Pope-Hartford Sales Corporation will be the Philadelphia agent of the Pope Mfg. Co., of Hartford, Conn., having superseded the West-Stillman Motor Car Co. in that respect. Temporarily the new company will be housed at 612-614 North Broad street.

Pittsburg, Pa.—The Liberty Auto Tire and Supply Co. will handle the western Pennsylvania and West Virginia business of the company. The Liberty also has closed for the agency of the Racine horse-shoe tires, its territory being northern Ohio. The Tube City Auto Co., of McKeesport, has secured the same agency for McKeesport and the surrounding towns.

Portland, Ore.—The East Side Automobile Co. has been absorbed by the Western Automobile Co. By this proceeding the Western Automobile Co. takes over the garage and all equipment at 209 North Union avenue. As heretofore, the Western Automobile Co. will be the agent for the Moline, Knox and Premier cars. The officers of the new firm are: Dr. G. E. Watts, president; E. D. Sutor, vice-president and

sales manager; E. V. Littlefield, secretary; W. A. Caldwell, manager.

Grants Pass, Ore.—The Lewis Automobile Co. has taken the agency for the Overland car and Kisselkar in this territory.

Crawfordsville, Ind.—The Albright Auto Co., agent for the Maxwell and E-M-F, has moved to its new garage at 210-216 East Market street.

St. Paul, Minn.—Plans are being prepared for a factory which the Schurmeier Motor Car Co. will erect at University avenue and Griggs street. It will be two-story, 150 by 150.

Boston, Mass.—The Davis Automobile Co., with Edward C. Davis as president, has taken the agency in Massachusetts for the Lexington. The company is located at 87 Church street.

Spokane, Wash.—L. D. Hewitt, Spokane Reo and Apperson distributor, has secured six counties for the latter and will sell cars in Spokane, Adams, Ferry, Whitman, Lincoln and Stevens counties.

Omaha, Neb.—The Marion Automobile Co. has taken the garage of the Van Brunt Automobile Co. C. W. McDonald is the manager of the new company, which has the agency for the Marion and Overland cars.

Kansas City, Mo.—A. L. Ruhl has begun the erection of a one-story brick building, 100 by 115, at the southwest corner of Seventeenth and McGee streets. It has been leased by the Rapid Motor Co., which has sublet a part of it.

Milwaukee, Wis.—The Mickelson Motor Co., of Milwaukee, Wis., organized last spring to build motors, has been incorporated. The capital stock is \$30,000. F. M. Mickelson, J. A. Mickelson and G. A. Mickelson are the incorporators.

Fresno, Cal.—A. B. Ward, of Ward's garage, is incorporating his business into a \$10,000 stock company and will operate under the name of the Reliance Automobile Exchange. He has associated with him C. H. Richardson, of Point Richmond. They will handle the Reo cars.

Milwaukee, Wis.—The Milwaukee Trust Co. has been appointed trustee in bankruptcy for the estate of Otis R. Cook, up to several months ago sales manager of the Federal Rubber Co., of Milwaukee, Wis. Mr. Cook filed a voluntary petition in bankruptcy last week, listing his assets at \$44,132, of which \$26,563 is claimed exempt, and liabilities of \$20,134.

Baltimore, Md.—Several changes have been made which affect the local office of the Ford Auto Co. Robert F. Kaehler, of the local office, has been placed in charge of the company's branch in Richmond, Va., where he will have charge of the Virginia district. A. M. Eastwick will have charge of the local branch. J. K. Harper, former manager of the Richmond, Va., branch, will be connected with the local branch of the company after January 1.

For This Winter

- February 13-25—Show at Brooklyn, N. Y.
- February 18-25—Show at Newark, N. J.
- February 20-25—Show at Omaha, Neb.
- February 20-25—Show at Cincinnati, O.
- February 20-25—Show at Baltimore, Md.
- February 24-27—Show at New Orleans, La.
- February 25-March 4—Show at Toronto, Canada.
- February 27-March 4—Show of Kansas City Automobile Dealers' Association, Kansas City, Mo.
- February 27-March 4—Show at Sioux City, Ia.
- March 4-11—Show at Boston, Mass.
- March 6-11—Show at Des Moines, Ia.
- March 13-18—Show at Cedar Rapids, Ia.
- March 13-18—Show of Cleveland Automobile Dealers' and Makers' Association, Cleveland, O.
- March 14-18—Show at Syracuse, N. Y.
- March 14-18—Show in Auditorium, Denver, Colo.
- March 15-18—Show at Louisville, Ky.
- March 18-25—Show in Pittsburg, Pa.
- March 25-April 1—Show of Pittsburg Automobile Dealers' Association, Pittsburg, Pa.
- March 27-31—Show of Cleveland Automobile Show Co., Cleveland, O.
- April 1-8—Show at Montreal, Quebec.
- April 4-8—Commercial Car Automobile Dealers' Association show of Pittsburg, Pa.

Changes In the American Pleasure Cars As Told Briefly

(Continued from page 17.)

new style of fenders is fitted. On the Stoddard 30 an entirely new L type motor is used. It has a circulating oiling system. On the Stoddard 20 a monobloc motor similar to that of last season is made use of for 1911.

New Simplex a Radical Change

In the new 38-horsepower shaft-drive Simplex car several radical deviations from previous Simplex characteristics are to be found. First the bore is longer than the stroke, shaft drive is preferred to side chains and three-quarter elliptic rear springs are used in favor of semi-elliptics. The general features of this new model, to be shown for the first time at Madison Square garden show, are a vertical type, four-cylinder, water-cooled motor, having a $4\frac{1}{4}$ -inch bore and $6\frac{1}{2}$ -inch stroke; T-type cylinders with valves mechanically operated from camshafts contained within the crankcase; a cast aluminum crankcase divided horizontally, and a three-bearing crankshaft supported in the upper portion of the crankcase. High-tension Bosch ignition is employed. A honeycomb radiator, centrifugal water pump and fan flywheel are features of the cooling system. Lubrication is by means of a mechanical oiler. Power is transmitted through a multiple-disk clutch, a four-speed ball-bearing gearset and a semi-floating rear axle. The chassis frame is a pressed steel structure of channel section mounted on semi-elliptic springs in front. Wheels are 36 by 4 front and 36 by 5 rear.

Selden Adds New Model

By far the most important Selden detail for this year is the addition of a new model on which three fore-door body types are fitted. This chassis differs from previous Selden types in that the side members of the frame heretofore straight from end to end are now narrowed at the dash and raised above the rear axle. Three-quarter elliptic springs have taken the place of the semi-elliptic types in the rear. The wheelbase has been increased from 116 to 125 inches. Two universal joints are used in the propeller shaft, which is now paralleled by a torsion rod. The timer and oil pump are now located at the center of the motor and the timer is elevated, being mounted on a pedestal on the crankcase.

Speedwell Has Few Changes

On the Speedwell chassis a cast aluminum dash is fitted and carries the circular end of the Bosch coil and a vertical glass tube oil sight feed. A new coupling has been inserted in the magneto shaft, which facilitates the timing of the magneto without removing it. Where the shaft is split on one end is a disk with eight holes, and on the other end a disk with ten holes. These disks are bolted together and the

combination between the eight and ten holes gives every desired accuracy. The ball-and-socket connections in the spark and throttle controls on the motor are now adjustable to take up wear. The timing gear housing is tapped at the left front to carry a gear to drive the Apple generator for generating electric current for the lighting system. This generator is not stock, but by tapping the housing and providing a seat for the generator on the motor arm it can be fitted on regular models when desired. The front end of the frame has been reinforced by heavy gusset plates at the point of union of the front cross member with the side pieces. Rear springs are flatter, giving the entire body a $\frac{3}{4}$ -inch lower carriage. The springs are now of Vanadium steel. All models are fitted with Firestone demountable rims. The 1911 Timken rear axle is used with its improved radius rod construction.

Two Stearns Models

In the Stearns models some changes in the conveniences have been made. The Bosch cylindrical coil is used, being carried horizontally in the dash with its switch end flush with the dash face. The air pump for maintaining air pressure on the gasoline has been taken off the dash and is now carried on the floorboard between the two front seats. The small gasoline tank on the dash, from which the gasoline feeds by gravity to the carbureter, has been improved with a new float valve and pressure regulator. Another brace has been added to the right running board to reinforce it and give it adequate strength to carry the demountable rims, which have been made stock on all models. The auxiliary oil tank, in which a supply is carried to replenish the crankcase, has now been located on the floorboards at the right.

Stevens-Duryea Little Changed

Very few changes have been made in the Stevens-Duryea cars, the company marketing three models, two six-cylinder types and one four-cylinder. All use cylinders cast in pairs. Each motor has a different cylinder size as follows: $4\frac{1}{4}$ by $4\frac{1}{2}$, six-cylinder; $4\frac{1}{4}$ by $4\frac{3}{4}$, six-cylinder; and $4\frac{3}{4}$ by $4\frac{1}{2}$, four-cylinder.

Thomas Has Few Changes

But few changes are to be found in the Thomas cars. In the model M the diameter of the valves is increased from $2\frac{1}{8}$ to $2\frac{1}{4}$ inches. The crankcase is now divided horizontally, so that the lower portion can be dropped as the crankshaft is supported in the upper section. This is a radical change from the barrel-type crankcase previously employed. In the cooling system the fan belt is now driven off a pulley on the crankshaft instead of off a pulley on the front end of the magneto gearshaft. A hand compression oil can has been provided, which sits on a specially designed holder on the top of the mechanical oiler. Tire sizes have been increased

on the rear from 36 by 4 to 37 by 5. The body is larger and more roomy, more elaborately equipped. The model K remains unchanged except that Continental demountable rims are a part of the regular equipment.

Winton With New Axle

Several Winton improvements have been carried out. On the motor, brass tubing has replaced aluminum castings for the water manifolds and also the intake manifold between the carbureter and valve cages. A cellular radiator, supported on an inverted channel cross member of the frame, has taken the place of the vertical-tube type. A Stromberg carbureter is now stock. At the right side of the motor a jaw coupling has been placed between the water pump and the timing-gear housing, thus making it possible to remove the pump without disturbing the magneto. The magneto is driven from a continuation of the pump shaft, in which continuation is a jaw coupling. A leading change in the running gear is the substitution of an I-beam front axle in place of the pressed steel type used last year. The side frame members are now dropped $2\frac{1}{2}$ inches in front of the rear axle. The radius rods have been improved and are now made with a ball-and-socket support at either end. Brake drums, which were 12 inches by $2\frac{1}{2}$ inches, have been increased to 14 by 3 inches. Tires were 34 inches in diameter, but are now 36.

New White Gasoline Car

The feature of the White line for the coming season is a new 40-horsepower touring car, which is practically a duplicate of the 30-horsepower model brought out in 1910 except that it is larger. The leading characteristics of the motor are its simple en bloc L-type cylinder construction, mounted on an aluminum crankcase having three-point suspension. The long-stroke principle is retained. Cooling of the motor is effected by water circulation, a centrifugal pump and honeycomb radiator. Lubrication is by means of a plunger pump, which forces oil to the main crankshaft bearings, splash to cylinders and wrist pins, and centrifugal force to connecting-rod bearings. Ignition is by means of a single high-tension magneto. Power is transmitted from the motor through a leather-faced cone clutch, a selective gearset having four forward speeds and reverse direct drive on the third speed, a propellershaft with two universal joints and a semi-floating rear axle equipped with annular ball bearings. The tire dimensions for the five-passenger car are 36 by 4 inches and 36 by $4\frac{1}{2}$ inches for the seven-passenger car. The wheelbase is 120 inches. The gasoline model brought out in 1910 is unchanged except that three-quarter elliptic rear springs are used instead of semi-elliptics. The steam cars remain unchanged.